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VOL. XXII. No. 4

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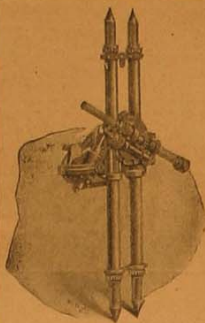
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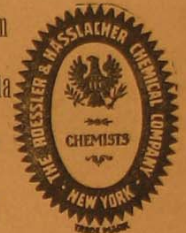
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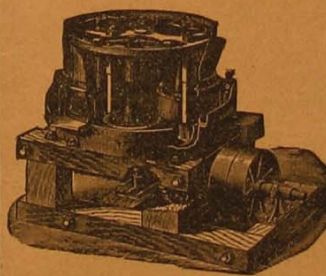
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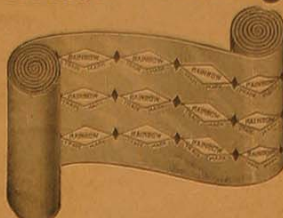


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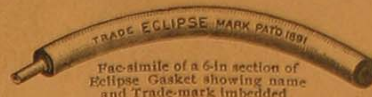
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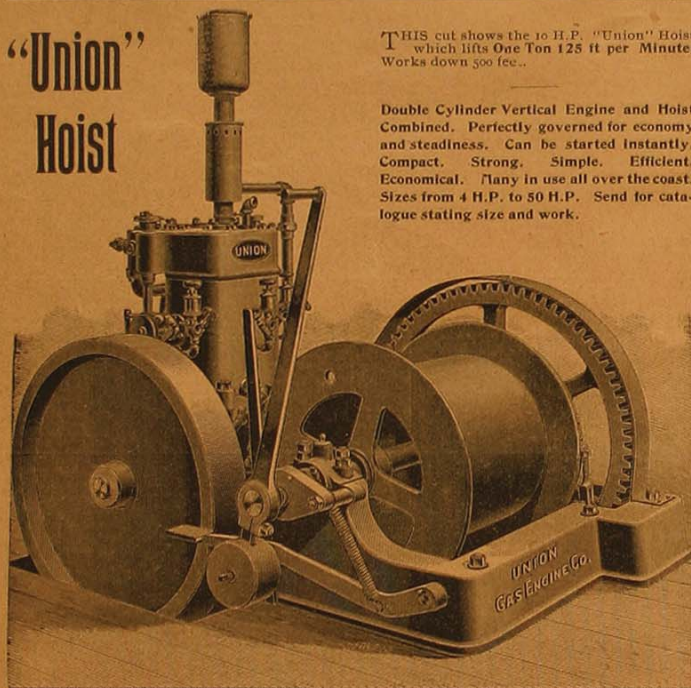
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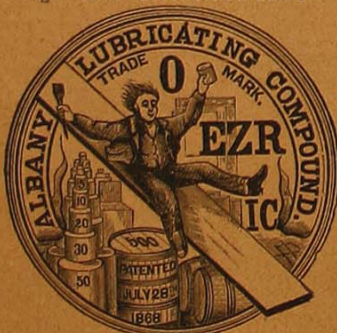
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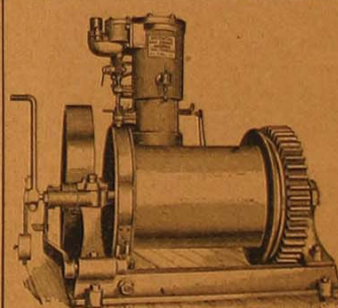
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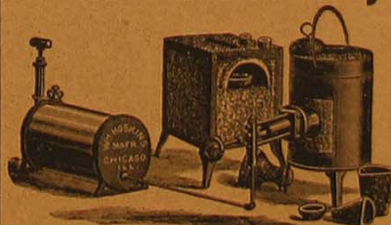
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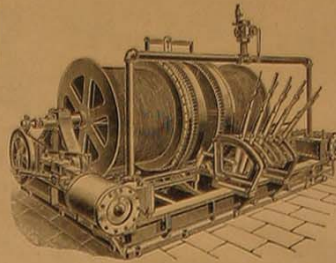
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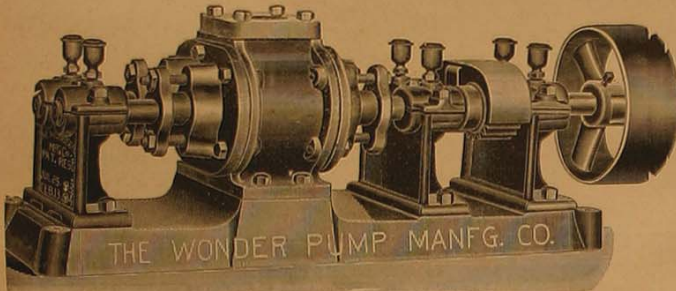
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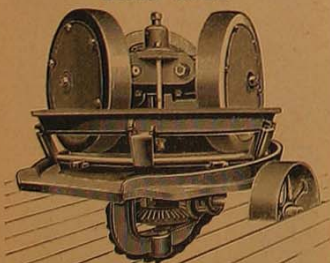
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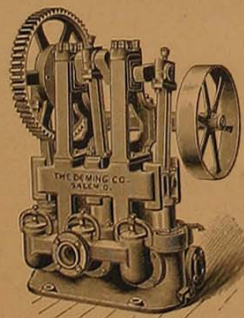
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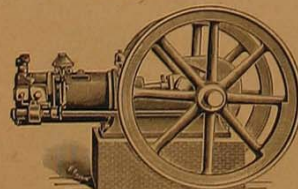
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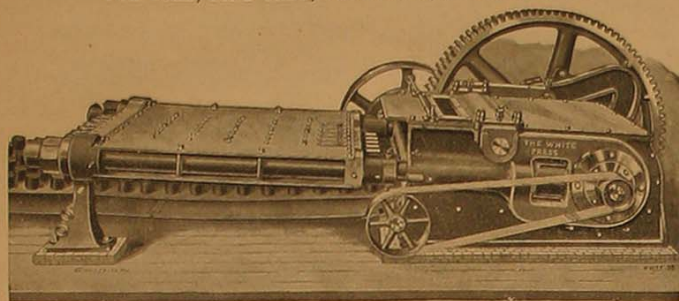
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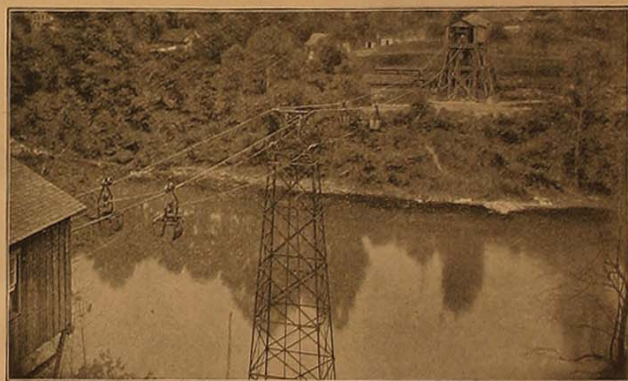
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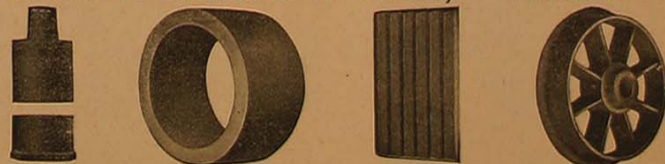
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dykes, which hold no gold and have to be left in the workings as posts and pillars or rejected as waste. This large class of deposits constitutes the bonanzas of the Southwest and is represented by the Golden Cross Mine near Yuma, deposits at Mesquite near Glamis, deposits on North Baldy Mountain, Los Angeles County, Holcomb Valley Deposits, Mineral Hill Mine near Ballarat and many others. It is interesting to note that prospectors have discarded them as worthless and left them to be located by others, and the Colorado expert of world-wide fame and the great Mother Lode miners of supposed infallible judgment have condemned them, as they had no experience in this class of deposits, and did not comprehend the fact that quantity of ore is the condition that makes the mine, when the machinery and facilities for working it economically are furnished. The possibility of mining and milling from one to several hundred tons of ore per day at low cost, and with a profit of one or several dollars a ton, renders this the most desirable class of property for the safe investment of large capital.

#### BONDING A MINE OR PROSPECT.

A great deal has been written as to the advisability of a prospector or mine owner granting the right to the intending purchaser to prospect or thoroughly test a claim before a sale is made. If conditions are imposed on the purchaser as to the manner in which the work is to be done and the amount of it that is required, then the claim owner is protected against dishonest work or trickery on the part of the intending purchaser, who, if holding fraudulent intentions to depreciate the value of the claim, when the purchase price has not been agreed on beforehand. If the property has not been exploited sufficiently to meet the requirements which the purchaser demands, then he should be bound to sink 50 feet, or still better, 75 or 100 and run levels and crosscut at that depth, and if more work is demanded, to sink 150 feet and drive levels and crosscut. By stating at what point and to what extent the work is to be done, the owner will protect himself in doing so. Under an option of this kind the purchaser has to perform the development in a workmanlike manner and not to depreciate the value of the property by covering up the ore which is found. To grant an intending purchaser an option or bond without such necessary precautions, is to place too much confidence in a stranger, especially if the owner is not always present at the property to see that the work is conducted for the betterment of his property. It is the custom with mining papers to state that owners of mining property claim and demand too much for their claims or mines, but there are exceptions to this rule, in those who have faith in the permanence and value of the deposit and are willing to grant a working option. A case of gross ignorance or willful fraud on the part of an Eastern firm of chemists or their representative who was interested with development work under an option to purchase a mining property in San Diego County, Cal., is a case in point. Positive intent to depreciate the value of the property by filling up with refuse rock openings where ore was found, is neither honest nor the act of a gentleman, when the owners were absent from the property. It is expected that an action at law for damages will be taken by the owners.

#### INTERNATIONAL MINING CONGRESS.

The Third Annual Session of the International Mining Congress will assemble 19th June, 1900, in the city of Milwaukee, Wis., and will continue thereafter at the pleasure of the Congress during 20th, 21st, 22nd and 23rd of June.

The greatest factor in promoting the power and growth of this country is the mining industry. It is the mining industry that is the power that will most easily, naturally and permanently build up our foreign trade, restore prosperity among the people and lay a firm financial foundation for the present and future generations. It is therefore desired that all earnest scientists, metallurgists and practical mining and mill men, manufacturers of mining machinery and all others interested in mining attend and participate in the deliberations of this coming session of the International Mining Congress, and by their presence, instruction and advice make the proceedings of this assembly of so interesting and educational a character as to command favorable consideration throughout the civilized world.

The Congress will not confine its consideration alone to that of mining for gold and silver and their by-products, but that of iron, coal, marble, stone, the various fire clays, asphaltum and all kindred interests of the mineral and metallic classes will receive attention.

It desires better recognition of the mining industry in the National Government; needed changes in the Federal Mining Laws; to cultivate acquaintance and to exchange practical ideas.

The basis of representation will be the same as on previous occasions, or as follows: The Governor of each State and Territory to name thirty delegates at large.

The County Commissions of each county to name five delegates at large.

The Mayor of each city and town to name five delegates at large.

And one additional for each 10,000 population or fraction thereof.

Each Mining Bureau to name five delegates.

Each Mining Exchange to name five delegates.

Each Real Estate Exchange to name five delegates.

Each Chamber of Commerce to name five delegates.

Each Board of Trade to name five delegates.

Each Miners' Union to name five delegates.

Each Trade and Labor Assembly to name five delegates.

And all other commercial bodies to name five delegates.

#### IRON ON THE PACIFIC COAST.

The advances made in the price of iron and steel by Eastern manufacturers, due to extensive consumption at home and the stimulating effect of an outlet opened up in the export trade to foreign countries, has caused an advance in prices in all lines, and a marked scarcity of raw material, such as pig and scrap iron on the Pacific Coast. Some railway lines who made heavy purchases of new steel rails before the advance in prices took place, have been able to sell the old rails at the advanced rate and thereby pay for the new rails, and some claim for the cost of relaying them. Old mining machinery, both

cast and malleable iron, is in demand for foundry and rolling mill uses. With the large export trade with China, Japan and the Pacific Islands in the near future, and the present home demand for iron and steel on the Pacific Coast, the construction of railway lines to the coal fields of Utah is an absolute necessity, which is required to bring the rich iron ore deposits of California and the coal from Utah and our California crude oil together, so as to make our large iron resources industrially beneficial at the present time. There is an excellent opportunity for the manufacture of foundry pig iron and car wheel iron and to supply billets for the local rolling mills in San Francisco and Los Angeles, Cal., to begin the industry. On these heavy classes of iron the high freight rates from the East and by ocean warrant the construction of blast furnaces on this coast, when we have obtained the coal for fuel from Utah. It is reported that the Randsburg Railway, which is a branch line from the Santa Fe, to the gold mining camp at Randsburg, Cal., is paying ten per cent profit, and when it is remembered that there is no heavy freight business on that line like hauling coal, the contention is warranted that lines of railway to the coal fields of Utah will be a paying investment for local traffic alone, but with a large coal trade and through connections will pay much better.

#### THE IRRIGATION QUESTION.

As time proceeds, this question more and more elicits public thought and discussion. It is amongst the most important of materialistic subjects presented for the consideration of the American people. It has taken no small amount of work to create a public sentiment favorable to the adoption of effective steps towards the solution of the problem. Vast interests are involved economic and social.

There is very little public land not taken up in regions where dependence is upon rainfall to produce crops, and hence congested populations, wherever they are, must find homes and means of livelihood in what are termed arid regions, where comparatively little for human support can be produced without irrigation.

In the arid domain, there are something like 700,000,000 acres belonging to the States and to railroads, under grants made to them by Congress, and about 500,000,000 acres are still owned by the general government.

Without some comprehensive and intelligent plan for impounding and conserving the waters, and for an equitable and economical delivery of them, the bulk of these lands will never be of very great value to the people of the United States. It is conceded that building and managing irrigation works will not be as effective under private enterprise as under the authority of government.

There is something of a division of sentiment on the question whether this work would better be done by the States or by the national Government. It is proposed by those who favor the former that the public domain shall be ceded to the States as a means of aiding them in the construction of dams, reservoirs, and the means of delivery of the water to the lands. It is a fact of history that the principal if not all the land frauds that have been committed in this country have been in the disposition of State lands. There have never been many complaints of federal officers in this respect. State legis-



latures have shown themselves not to have been above manipulation.

The general Government has a well organized and able corps of engineers. It has existed for nearly a century, and has been under constant training during all that period. It is learned and experienced in the art of engineering. It has always maintained a high reputation for honesty and industry. The States are not thus equipped, and it would take a long time for them to provide themselves with such equipment. Besides, it is improbable that any two States would adopt the same plan, while that of the general Government would be systematic and similar throughout the entire arid region. The Government engineers have been accustomed to do their work well.

The lands supplied with water should be disposed of with a water right annexed, and on condition that the two should remain inseparable, and that charges should only be enough to defray the expense of operating the plants and keeping them in repair, and that all classes should be impartially treated. This would avoid the monopoly which arises when irrigation is by private enterprise. Water, like the air and sunlight should never be made the subject of monopoly.

The need for homes and larger production, incident to the growth of population, press this subject upon the country. Even in the far east, the people have become aroused to it, and now look upon it with favor, when a few years ago the proposition that the Government should undertake the work was regarded as utopian. The need for enlarging the area of production is made apparent in the falling off in the number of meat animals. Since 1892, the reduction of the number of cattle has been 9,000,000 head; of sheep, 5,000,000; and of swine, 13,000,000. Production and consumption in this country are rapidly approaching an equilibrium.

#### MODERN PRACTICE IN GOLD MINING.

BY JOHN HAYS HAMMOND.

Problems in mining may be classified as those relating to—(1) mining geology; (2) mining engineering; (3) metallurgy; (4) mechanical engineering.

1. Mining geology deals with the determination of the geological character, with especial reference to their genesis and magnitude, of ore deposits and co-relatively their commercial values. This is the most important province of the mining engineer, but, unfortunately, one in which but few are proficient.

2. Mining engineering.—In this class are the problems relating to the methods of the exploitation of the mine.

3. Metallurgy.—Under this category are included the methods of reduction of ores. This branch of mining engineering is rapidly becoming specialized. The importance of the problems presented to the metallurgists is obvious, as they relate to the adoption of appropriate processes upon which depend the highest percentage of extraction of the metals from their ores with the least possible reduction charges.

4. Mechanical Engineering.—In this class are the problems pertaining to the installation of mining machinery.

The problem of deep mining likewise belongs to this class, and the author would point out the salient factors of this problem. The great importance of deep mining, *i. e.*, of obtaining maximum depths—may be

gauged by taking the special case of deep-level mining upon the Witwatersrand. As is well known, this formation is unique as regards its reliability, both in respect of the continuity of the ore-bearing formation and of the payable grade of the ore. There are many miles of reef along the Witwatersrand banked formation, but estimate here is confined to the central, which has been more thoroughly explored than the other sections of the Rand. The author has estimated the value of the gold contents per lineal mile, along the direction of the outcrop of the reef, worked down to a vertical depth of 1,000 feet, to be £9,000,000 sterling. The central section embraces upwards of ten miles, to which the above estimates apply. These are obviously sufficient to stimulate the ingenuity of the engineer to increase the limits of deep-mining.

The main factors determining the limit to which deep mining may be carried are—(1) Depths *per se*—*i. e.*, costs of deep shafts and of haulage; (2) ventilation; (3) drainage.

1. Depths *per se*—From an engineering point of view mining could be carried on at depths which considerations of an economic nature would preclude. With the existing types of hauling engines, wire cables, etc., there is no difficulty in hauling through vertical shafts from depths of 6,000 feet. An improvement in types of engines and appurtenant machinery, which is undoubtedly within the power of the engineer, would enable this depth to be considerably increased. From the bottom of the vertical shaft an incline shaft, or a second vertical shaft, could be sunk to a vertical depth of, say 4,000 feet, thus giving a total depth of 10,000 feet. Such depths increase greatly the first cost of operations, in that they involve a corresponding increase in the size of the plant required for short sinking, for hauling, mining, material, miners, and ore, in addition to the cost of the shaft itself. The actual extra cost per ton of ore, etc., hauled would not be excessive, and would not greatly militate against profitable mining, unless the margin between profit and loss had already been a narrow one in the shallow levels.

2. Ventilation.—One of the great obstacles to deep mining is the difficulty of securing the requisite efficiency of ventilation. This is due to the increase of heat in the workings as depth is attained. The heat encountered in mine workings may be due to one or a combination of two or more of the following causes:—

(1) The increasing secular heat as the interior of the earth is approached; (2) proximity of the mine workings to regions of heated volcanic rocks, solfataras hot springs, etc.; (3) chemical decomposition of certain constituents of the ores, or of the enclosing wall rocks, confined to deposits of comparatively rare occurrence; (4) animal heat and heat due to illuminants and explosives, all of subordinate importance. Geologists estimate as the result of deep boreholes and other tests, that the average increment of temperature due to internal heat of the earth is 1 degree Fahr. for about 60 feet vertical depth. The rate of increase in different localities is by no means uniform, sometimes being as low as 1 degree Fahr. in upwards of 250 feet vertical depth. Indeed, in the same mine, the increment of heat is not invariable, though generally it is fairly constant in some mines, indeed, remarkably so. The isogeotherms are chiefly affected by the proximity of regions of solfataric action or other volcanic phenomena, and by the conductivity of the

rocks in which they lie. If 1 degree in 60 feet be accepted as the average increment of temperature, there will be an increase of 16 degrees per 1,000 feet vertical, equivalent to 80 degrees at a depth of a mile. Assuming the normal surface temperature to be 60 degrees Fahr., this would give a temperature of 140 degrees Fahr. one by no means insuperable, but at the same time not economical. To counteract the effect of this undue temperature, artificial ventilation is requisite. Under very favorable conditions, the cost of the necessary artificial ventilation in metal mines, especially where inflammable and noxious gases are of rare occurrence, would not preclude mining to depths of 10,000 feet. Nevertheless, high temperatures, even when not intolerable, entail extra expense, due to the fact that the miners are more or less incapacitated.

Under these abnormal conditions short shifts are adopted, and not only artificial ventilation, but also the frequent use of iced drinks, cold baths, etc., are necessary.

(3) Drainage.—This is one of the least determinable factors. The water pumped from mines is sometimes almost exclusively limited, even in workings of considerable depths, to the upper levels of the mines. On the contrary, however, there is sometimes a progressive increase in the water as depth is attained. The increase is by no means constant, and generally varies considerably from level to level, depending upon the character of the ground drained by underground developments. Where there is an abnormal influx in depth, the expense of pumping becomes a menace to profitable mining operations, though under normal conditions this increased cost may not prove an insuperable factor.

The extra cost of deep mining, as has been indicated, is chiefly due to longer haulage, etc., to increased cost of drainage and of ventilation. In the working costs of shallow mines, or those of moderate depths, these items are small compared with the total cost, in which are included general expenses, cost of development, stoping, metallurgical treatment, etc. Therefore the additional cost of mining in depth entailed by these factors could be considerably increased before reaching a sum which would make deeper mining unprofitable. The factors, then, which determine the limit of deep mining, and, by deep mining, depths of 4,000 feet and upwards are referred to, are—(1) The discontinuance, or, what is tantamount, the impoverishment of the ore deposit. This, irrespective of other considerations, is the cause of cessation of deep mining operations in the majority of cases; (2) the excessive costs of first plant, of ventilation and drainage under favorable conditions. This applies especially to the exploitations of ore deposits, where the margin between profit and loss is close; (3) difficulties of a purely engineering nature.

From the foregoing considerations it will be seen that the difficulties included in this category will not be insuperable until long after the question of deep mining has become one of academic interest alone.

Engineers, who make a trial of genuine Albany Grease, cheerfully acknowledge its superiority for all lubricating purposes. L. T. Snell, of Natick, Mass., writes under date of October 23rd, to Adam Cook's Sons, New York, sole manufacturers, as follows: "Your grease is all right. I have some of another make on hand. When used up will give you a call."



## BELT CONVEYORS.

A 48-page pamphlet and catalogue bearing this title has just been issued by the Robins Conveying Belt Company, 147 Cedar street, New York, and as it is the first illustrated and complete description of this system which has appeared, a few extracts from it will be of interest to those engaged in the mechanical handling of material.



FIG. 1.

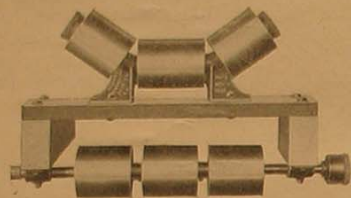


FIG. 2.

The construction of the belt and idlers is shown in cuts Nos. 1 and 2. The dark portions of the belt are rubber and the light of cotton duck. The heavy reinforcement of rubber in the center where the load is carried enables the belt to withstand abrasion which would destroy an ordinary belt very quickly and also make the belt pliable enough to conform readily to the trough idlers. These are lubricated by grease cups through hollow shafting, being thus rendered dust proof. These as well as the take-ups, pillow blocks, and all the other component parts of the Robins system have been standardized, and belt conveyors have been raised from the category of makeshifts to the rank of finished machines adapted to all the varying propositions in which conveying machinery is required.

Thirty or more pages of half tones show these conveyors in operation in all parts of the world and under a great number of different conditions. The three cuts here given show three of the most typical uses of belt conveyors.

No. 3 shows a conveyor at work carrying dredgings of rock, gravel and mud from a dredge to the river bank. The dredge is engaged in widening the Danube below Vienna, and the work required a conveyor with a capacity of 1,200 tons per hour. The Belt Conveyor was the only machine which could handle such an amount of material. The

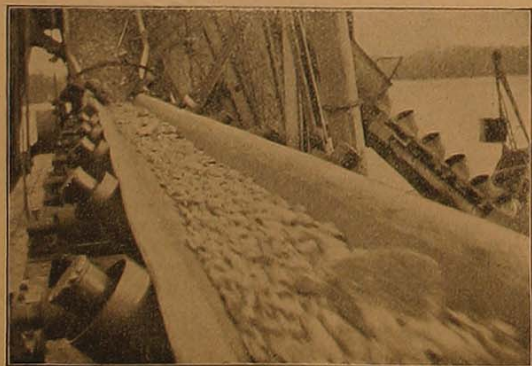


FIG. 3.

belt is still in good condition after two years of most arduous service.

No. 4 shows the belt conveyor used in place of a sorting table by the Sterling Iron and Zinc Company, Franklin, N. J. This is a service for which it is especially adapted. There are no teeth or links to wear or get out of pitch, nor bearings exposed to dust or grit, nor any crevices where a piece of ore can stick or jam. The belt, on account of its elasticity will stand for several years an amount of pounding, hammering and abuse that would in a few weeks destroy a machine more rigidly constructed. For this work a wide, heavy belt is used, with idlers, so shaped as to give the belt a broad, flat surface at the center and narrow, very slightly raised sides.

No. 5 illustrates the Robins Patent Tripper in operation. By means of this device, the belt is enabled to empty its load at fixed or moveable points along its length, its position being changed either by hand or automat-

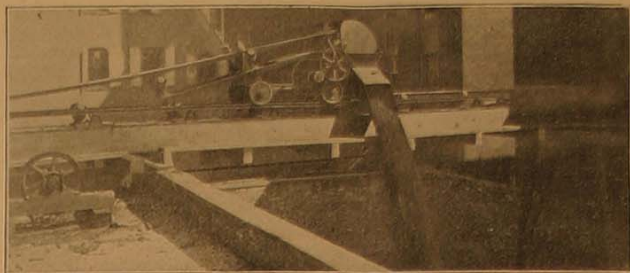


FIG. 5.



FIG. 4.

ically. In the latter case, the tripper may be made to move back and forth along the line of the belt, reversing itself at either end and distributing its load as it goes. The tripper is principally used in storing material in piles or in bins.

## Transvaal Mining Exhibit at Paris in 1900.

Captain A. H. Mattox of the Bureau of Publicity of the U. S. Commission to the Paris Exposition says: "Of all the Foreign Exhibits at the Paris Exposition of 1900, the most advanced is that of the Boers of the South African Republic. Just what effect the war between England and the Transvaal will have upon this exhibit of the Boers depends upon the result of the war. The Transvaal Exhibit, if carried out, will be one of the most interesting of the Exposition. The French authorities have allotted the Boers about 40,000 square feet, and this limited space President Krueger proposed to fill with novel displays from the Transvaal.

In the National Pavilion of the

Transvaal, which is built in architecture after the Holland style, President Krueger intended to display all geographical documents, also exhibits of the Military Administration. Public Instruction and the very interesting Ministry of Mines.

In the two other Transvaal Pavilions will be shown how gold is taken from the earth; how it is amalgamated by mercury, and how the ingot worked, chiselled or struck, is transformed into jewels or coins.

The mill building for the treatment of gold ore will be composed of two parts between which will be installed the "cyanuration" in the open air as practiced. In one of these parts will be the apparatus for crushing the ore. A battery of five pestles will be placed in operation before the eyes of the public. In the other building will be established a foundry for gold and a laboratory where the public can see for themselves that the gold industry applies in a remarkable way to indications which science has brought and the progress which has followed its movement step by step.

The driving force, in the form of electric energy, will be furnished by the large central mills established by the Superior Exposition of the Champs de Mars.

Leaving the mill of the Boers, the visitors will have access to the subterranean galleries where will be installed veritable workshops for the exploitation of the two great industries of South Africa, gold and coal.

The Subterranean Society of 1900, to whom has been given by the French authorities of the Exposition a concession of all the ground under the Trocadero, has contracted to give space to the South African Republic for the installation of underground galleries of ore and coal, and veritable work yards exploiting gold and silver will be established.

The display of rough metals, such as gold, iron, silver, brass, lead, zinc, silica, tin, cobalt, diamond material, cinnabar and magnetic steel, with the machines for extracting and working the same will be most interesting.

The E. P. Allis Company of Milwaukee, Wis., will shortly erect two new shops; one will be equipped with the most improved and largest type of machines for manufacturing pumping and blowing engines; in the other the company will manufacture mining and saw mill machinery.

H. H. Lemare, of New Orleans, pres. of the South Louisiana Salt Co., was in Pittsburg a few days ago and placed orders for \$100,000 worth of plates for salt tanks, to be shipped by boat. Mr. Lemare stated he would be back in a few weeks to buy boilers and machinery.



## PORTO RICO AND HER MINERAL RESOURCES.\*

(BY MANUEL VICTOR DOMENECH, C. E.)

The mineral resources of the island of Porto Rico have not only never been developed, but have not even yet been explored. Although the island was discovered in 1493 and settled shortly afterwards by the Spaniards, no attempt, worthy of the name, has ever been made to even investigate any of its natural resources. The proverbial Spanish greed for gold did not lead to the opening or the operating of mines, and it seems to be the fate of Spain at home as well as in her late colonies, to have had her mineral wealth developed almost entirely by foreign capital and skill. In all the course of over four centuries not a single practical step has been taken to encourage the growth of any mining industry on the island. With the exception of a crude development of materials of construction, the island stands today without a single mine of any kind in operation, and with the further exception of the late development of the phosphate on the islet of Mona, now abandoned, there has never been any real mining machinery used on the island. All this, moreover, in face of the fact that the existence of valuable minerals has been known ever since the discovery of the island. Generation after generation has seen gold taken out each succeeding year from the river beds and the parent lodes have not been hunted for; each successive French and Spanish exposition has contained an exhibition of rich mineral specimens, and there has never been any scientific inquiry made, either on the part of the government or of individuals. Except in a few rare instances, there has not been even so much as an analysis of the specimens. This condition of affairs is difficult to explain, but is very likely due to a combination of causes; to Spanish procrastination, a corrupt administration of the law, absence of transportation, lack of capital and of technical skill.

The island of Porto Rico is rectangular in shape, extending in length about ninety miles in a course due east and west, and having a width of some thirty-seven miles. Around the coast extends a narrow strip of level land varying from two to five miles in its width, but the rest of the surface is very mountainous and there are no plateau lands except a small area around the town of Caguas. Two roughly defined and nearly parallel mountain ranges cross the island from east to west, the mountains in the northeast rising to an elevation of 3,300 feet above sea level and those elsewhere to about 2,000 feet. The sides of the mountains are precipitous, and the valleys narrow and traversed by innumerable small streams which become violent rivers in the rainy sea-

son. There are but few good passes through the mountain chains and the roads leading through ascend to an elevation of 1,000 to 1,500 feet in the course of a few miles. The heavy rainfall of the months of August, September, and part of October necessitates many bridges and makes road building costly.

The island is divided geographically into seven divisions called jurisdictions, and these in turn are subdivided into barrios; for the sake of definiteness, these terms will be used in this article.

Almost all the buildings of Porto Rico are constructed either of wood alone or of wood and brick. Quarries of hard stone are found in all parts of the island, but are not utilized at the present time, although many exist in close proximity to the towns. Various granites and syenites are found in profusion near the towns of Naguabo, Fajardo, Juncos, Piedras, Yabucoa, Caguas, and others; marbles abound at the towns of Naguabo, Rio Piedras, Cayey, Coamo, Juana-Diaz, and many others. Compact limestone of a good quality is found all over the island. The marbles and jaspers, although existing abundantly and possessing great merits and beauty, have never been developed and are not likely

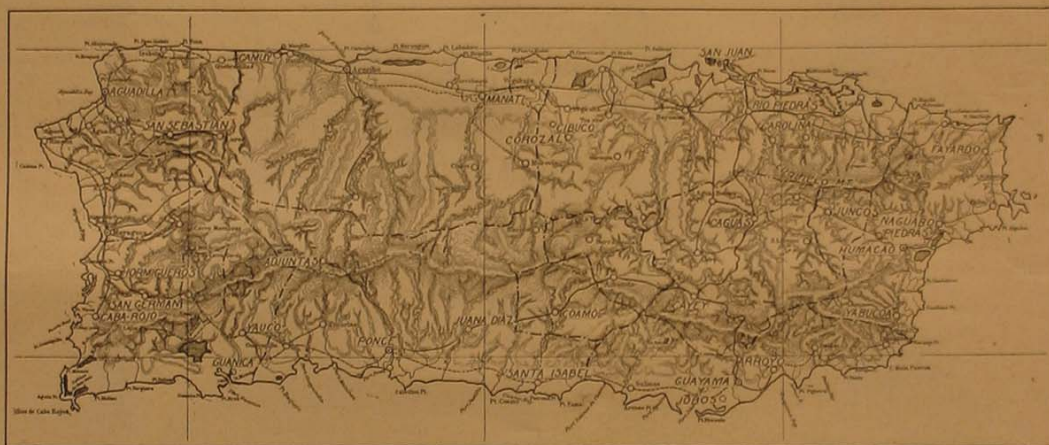
the feldspar needed in this industry is abundant in many parts of the island.

Large deposits of slate exist along the river Descolocada, the waters of which have cut out a deep channel exposing the deposits.

The most important known metallic minerals of the island, are gold and copper. The first of these has never been regularly mined and today there exists here neither mine nor concession, nor has there been any general prospecting done. For many generations, a few natives have devoted themselves to washing out small quantities of gold, but they have contented themselves with making superficial excavations in the banks and beds of the rivers and creeks, using a small pan, called "gabeta," to wash out the particles of gold. The gold is usually found in small grains and threads, although it is not unusual for pieces to be found worth one to two pesos, (Mexican dollars) and cases are cited of nuggets which have weighed from  $\frac{1}{2}$  to 4 ounces.

A conservative estimate of the value of gold produced annually in this way would be six to eight thousand pesos. The auriferous zones are sufficiently extensive and widely distributed. The ones actually known and

worked in the manner above explained, are those of Corozal and Luquillo. According to Don Angel Vascóni formerly chief engineer of mines for the island, the first zone includes a large part of the territories drained by the following rivers: Corozal, Congos, Negros, Cibuca, Mavillas, and perhaps the Manati; the second includes the northern slope of the



PORTO RICO.

MINES AND MINERALS

to be until better means of transportation shall be provided.

Small quantities of flooring and roofing tiles are made but are not used except in a very limited quantity; the price at which they are sold does not permit competition with the imported galvanized iron so extensively used at present.

The quicklimes made in the vicinity of Juana-Diaz and Ponce are much prized by the sugar planters, who use them to neutralize the acids of the juice of the cane.

The fatty limestones furnish the base for the manufacture of lime and are abundant in all the littoral lands, failing only in the eastern syenitic zone and being scarce in places in the interior. The method of manufacturing the lime is very crude, only intermittent kilns being used, there being no continuous kilns in use on the island.

Gypsum is scarce and lime is generally used in its stead in building, but it is found in many places, in the town of Juana-Diaz and in large quantities in the barrio de la Florida, jurisdiction of Manati.

In the jurisdiction of San German are found large deposits of kaolin of a quality apparently very superior, it being used there for painting instead of white lead. It might be utilized in the making of white porcelain;

Luquillo range, where rise the rivers Mameyes, Grande Espritu-Santo, and Sabana. The river Loiza, like all the above named, carries in its sand, particles of gold in greater and less profusion. The grains found in the alluvial soils of the lower regions of the valleys are very small and accompanied by minute particles of platinum invisible to the naked eye.

On the southern slope of the same range of Luquillo are found the best known copper deposits on the island.

Copper sulphide is found in the Corozal and a sample of blue carbonate in feldspar has been exhibited coming from the barrio Quebrada Limon, jurisdiction of Ponce. All the other samples, so far exhibited, came from the extensive mineral district which extends along the south slope of the range of Luquillo as far as the mountain of Pandura near the town of Yabucoa, with a course following the river Gurabo until near the town of Caguas. The geological formation of this district is very uniform; in almost all of it are seen sedimentary strata of the Paleozoic age; granite with some amphibole, syenite with mica, in conjunction with feldspars in a very advanced stage of decomposition, producing great plains of clay lands.

In the vicinity of Pena-Parada and in the

\*Abstracts from an article in Mines and Minerals.



rivers Icacos and Cubuy, whose beds are formed by granite masses, are seen enormous banks of white marble and porphyry, replacing the granite. Near Rio Blanco, some ten miles from the town of Naguabo, there have been worked two mineral concessions, called "Perseverancia" and "Santa Teresa." From the veins and lodes which cross the metamorphic limestone of the former and from the outcroppings in the latter, were taken out the greater part of the materials mined, the average yield being not less than 12 per cent. of copper. From the last named mine were taken several tons of copper sulphides whose richness was greater than that of the carbonates, and of which one sample showed 38 per cent. From the mine Constancia, an ancient concession long since abandoned, situated in the barrio of Dos Bocas, jurisdiction of Corozal, samples were taken showing 33 per cent. of metal. Other indications of copper are found as follows: in the neighborhood of the village of Piedras, with a course north and south and at a distance of five-eighths of a mile from Humacao; also at a place called Pitajaya, in the barrio of Marneno, jurisdiction of Ponce; near the town of Jayuya, jurisdiction of Utuado; in Maricao, in Serpentine rocks; in the barrio of Pinalejo, jurisdiction of Guanica, where have been observed signs of copper, and finally, at a place near the main road from Caguas to San Juan. The following shows the results of the official analyses of samples from all the known copper deposits:

Carbonate of copper from the mine "Perseverancia" 33.50 per cent.

Variagated copper from the mine "Perseverancia" 31.60 per cent.

Copper bearing pyrites 25.30 per cent.

Variagated copper from the mine "Santa Teresa" 38.00 per cent.

Mixture of carbonate, pyrites, and native copper 52.10 per cent.

Carbonate impregnating the rocks of the Santa Teresa" 23.00 per cent.

Variagated copper from the Corozal mountains 33.00 per cent.

Sands and crystals of sulphide of copper 65.30 per cent.

Carbonate from Maricao 3.10 per cent.

Carbonate from Las Piedras 3.50 per cent.

Carbonate from Humacao 4.50 per cent.

Carbonate from Penalejo 3.00 per cent.

From the above figures it is to be noticed that high grade copper ore is found in various places, on the Island of Porto Rico, and time will no doubt develop many of them.

Iron ore has been found at the town of Jayuya, jurisdiction of Utuado, and auriferous iron pyrites in the river Congos, in the Corozal mountains, but no analysis has been made of either; it is certain that the oxides from Jayuya could not be profitably worked at the present time because of the great diffi-

culty of transportation from the interior to the coast. On the left bank of the river Gurabo, barrio of Ceiba del Norte, jurisdiction of Juncos, exists a mound 300 feet high, 1½ miles long and 1,800 feet wide at the base formed by feldspars and amphibole within which is a huge mass of magnetic iron oxide which shows by analysis 59½ per cent. of iron. This deposit is distant only eleven miles from the nearest port.

Silver and lead have not been matters of development in the island although there are signs of their existence. Samples of galena from the barrio of Guadiana, jurisdiction of Naranjito, show a yield of 58½ per cent. of lead, and 856 grains of silver for each 220 pounds. There have been shown samples of foliated galena from near the town of Mayaguez. From the banks of the river Rio Blanco have come pieces of native sulphur and some samples of mercury. Native sulphur is also found near the village of Aguas-buenas.

Traces of other minerals such as manganese, bismuth, and antimony have also been found on the island.

Of combustible minerals but very little is

Juana-Díaz, San Sebastian, San Lorenzo, and Ponce. The most important of these are the baths of Coamo, near the village of the same name, and situated on a small elevation on the left of the road leading from Coamo to the village of Santa Isabel. The springs give an abundance of water. The analysis of the hot sulphur water gave as result per 1,000 parts of water the following:

Carbonic acid.....	21.37
Hyd. sulphuric acid.....	23.47
Hyd. chloric acid.....	0.54
Carbonate of lime.....	0.25
Carbonate of magnesia.....	13.72
Sulphate of lime.....	0.26
Sulphate of magnesia.....	0.54
Sulphate of iron.....	3.07
Silica.....	0.70

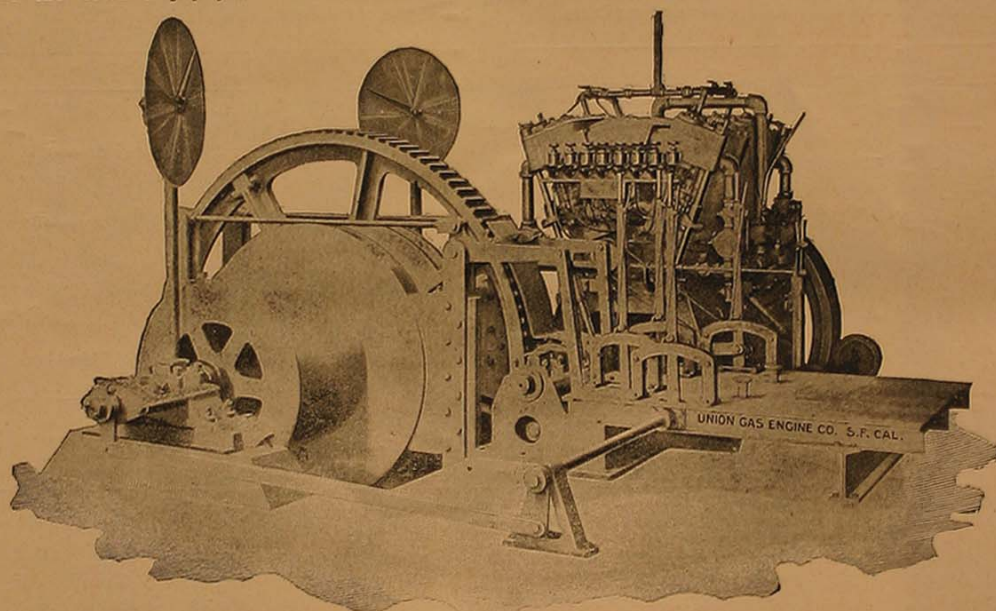
The temperature is 45° Centigrade, and is the same in all the springs, odor slightly sulphurous; specific gravity, 1.233.

At Punta del Agua, jurisdiction of Caba Rojo, exist works for the extraction of marine salt, and at the same place are also the natural salt deposits belonging to the State, which have produced several thousand bushels of salt annually, but the high tax imposed has prevented any proper development of the latter. Natural salt is found also at the towns of Salinas, and Guanica in enormous quantities. Spasmodic efforts, both by individuals and by the government, have been made to develop this industry, but were ill directed and failed of success.

The fertilizing minerals consist of sulphates and phosphates of lime, and while deposits of these substances exist all over the island, the only ones so far developed are those located on the islets of Mona and

Monita, both of which lie in the San Domingo channel, a short distance west from the town of Mayaguez. The fertilizer is found in cave-like subterranean galleries, partly filled with old, organic products mixed with carbonate of lime. A German Company undertook the development of the mines on the island of Mona and exported 9,000 tons to Europe in 1894 but at present has ceased operations.

Finally, as to mining laws, it must be remembered that the Spanish Crown never granted any patents except for the surface of the land and so much of the subsoil as was necessary in using the surface. The Crown reserved the title to the subsoil as well as such easements in the surface as are necessary to the development of the subsoil. With regard to minerals located on or under private property, there are three persons interested, the Crown, the owner of the surface, and the person who discovers the mineral. The State has divided all mineral substances in the following three classes: 1st. Such as quarries of building stones, sands,



130 H. P. GASOLINE MINING HOIST. SEE PAGE 43.

known; peat and lignite abound at various places but the matter has received almost no attention. On the north coast lignite is found generally beneath the Tertiary limestones but it contains a large quantity of iron pyrite and has never been developed. Many years ago a Company was formed to develop a mineral concession near the village of Moca, registered under the name of "Monserate," but it did nothing beyond sending one small steamer load from the port of Aguadilla to San Juan. In the jurisdiction of Utuado occur lignites which appear to be free from pyrites, but the absence of means of transportation has prevented any possible development. Near Caba-Rojó are deposits of lignite strongly bituminous which might be tried for the extraction of illuminating oil. Evidences of the possible existence of petroleum are found at various places. The turfs and peats which occupy many thousands of acres along the north coast and elsewhere might be made the basis of a very profitable industry.

Mineral springs occur at several places on the island, the principal ones being at Coamo,



granites, marbles, etc. These belong exclusively to the owner of the surface. 2d. Such as placer deposits, mineral-bearing sands, and washings, ochres, etc. In these, the State reserves the right to grant them to whomsoever solicits a concession; the owner of the surface, however, having the right to develop them as his exclusive property, but upon his refusal to do so, the State may grant a concession and provide for a proper indemnity to the owner of the surface. 3d. Deposits of metallic minerals, of coal, petroleum, etc. Are the exclusive property of the Crown and require a concession, which, when given, confers an absolute ownership, independent of the owner of the surface. In the public or Crown lands the State may grant any kind of concession it may deem fitting.

The manner of proceeding is simply to file a claim before the civil governor. Claims are entitled to consideration according to priority of application. The size of one claim is 100 meters square, and there is no limit as to the number of claims allowed to one person provided they are developed.

Prospecting in the public lands is absolutely free; in the private lands the consent of the owner of the surface is required.

#### Union 130 H. P. Gasoline Mining Hoist.

The illustration on page 42 shows the latest development in gasoline mining hoists. It consists of a 4 cylinder vertical gasoline engine of 130 H. P. combined with a double drum geared hoist, which is intended to work down to a depth of about 2000 feet. It was built for the Yellow Aster M. & M. Co., of Randsburg, Cal., by the Union Gas Engine Co., of San Francisco. The hoist is to be placed under ground about 350 feet from the mouth of the tunnel at the head of an inclined double compartment shaft.

It is arranged to start the big engine with a small auxiliary one, the latter being used also for running the blower for ventilating the mine. Both engines run on distillate, which is about half the cost of gasoline when delivered at the mine; but they can also be run on naphtha, benzine and any grade of gasoline. The levers are all brought to one platform, enabling the engineer to have full control over both hoist and engine, as in modern steam practice.

The double cylinder and four cylinder engines are particularly well adapted to hoisting purposes as they have more frequent impulse than the single cylinder engines, and as each impulse has a smaller volume and force, the result is that the load is lifted more steadily.

The Yellow Aster M. & M. Co. has been using one of the "Union" hoists for the past two years with such good results that they ordered from the same Company the hoist of 130 H. P. The Union Gas Engine Co. make a specialty of gasoline mining hoists and engines, which they have been building for the past fifteen years.

#### MINING IN SOUTHERN CALIFORNIA.\*

(BY O. S. BREESE.)

As a western writer once said: "Eastern newspaper statisticians are proverbially masters of the art of inaccuracy, and their so-called statistics are usually to be taken like dreams, or women's whims, by contraries. But they are probably not far wrong in their every-season estimate that a hundred thou-

sand Americans annually make the tour of Europe, at an annual expense of at least a thousand dollars each. This is a total of a hundred million dollars a year, expended by new-world people in familiarizing themselves with old-world scenes, while, as a general thing, they are wholly unacquainted with the infinitely grander scenes and scenery on their own side of the Atlantic. How many of them have ever seen the grandeur, the beauties and sublimity of their own matchless land? How many of them have ever dreamed that our own is incomparably the grandest continent on the globe? How many of them have ever looked over the natural resources of our country? Can other lands and nations talk of their mines of gold and silver, such as the exhaustless bonanzas of California, Colorado, Montana, Idaho and Utah, where mountains of valuable minerals rear their mighty summits toward the skies, and where the ceaseless thunder of the world's greatest bullion mills resounds in the yet warm lair of the Rocky Mountain Grizzly bear.

Californians' names have been heralded from all quarters of the globe, and yet we have to find a land that compares in the mineral wealth and scenery with that of our own state.

Southern California is less known than the northern part of the State, because it has not been developed to any great extent until the last few years, since when however, numerous and valuable mineral resources have been exploited.

Beginning with the Southernmost county of the State (San Diego, with an area of 8,800 square miles) we find many rich mines and prospects. A large part of the county consists of desert, but in nearly every hill and range rising above the barren sandy plains, are found veins and ore deposits, some of which are phenomenally rich in gold. The Golden Cross Mining and Milling Company own a large tract of mineral land in the Cargo Muchacha Mountains, and have 140 stamps dropping on ore, turning out gold bullion at the rate of \$1,000 to \$1,500 per day, and within four years have produced over \$2,000,000 gold bullion. Encouraging results have been obtained from the Picacho district 30 miles north of Yuma on the Colorado River. The Julian and Banner Districts in the central portion of the County continue to add to the output of gold, as do also the various mining fields along the Cuyamaca Range.

Riverside, the next County north, has developed into a wonderful gold producing section of the State. This County has 7,000 square miles covered with a network of gold-bearing veins. Rich mineral sections are spread from one end to the other. The portion of the County north and east of Salton, on the Southern Pacific Railroad, known as the Colorado Desert, including the Dos Palmas, Canyon Springs, Chucawalla, Eagle, Coxcomb, Maria, Cottonwood and Ironwood Mountain Ranges, which comprise a territory of more than 3,000 square miles, is one vast mineral bearing section. To name any of the meritorious properties in these districts would slight the rest of equally good propositions, and to name them all would be too voluminous. West of the land just named are the Monte Negras, the Pinon and Virginia Dale Districts, the last named containing the thriving little camp of Dale City, at which considerable mining is being carried on. Still farther west we find the Tauquitz Mining District, and north-west of

this is the Menefee and Pinecate, including the gold producing camp of Perris. Between these and further south, the Gavilan Grant, owned by an English Syndicate, is being thoroughly prospected and the Riverside Mine located upon it. The Temescal Tin Mines are found upon this grant.

Leaving Riverside County, we will take up the largest County in the State, and one which has been producing valuable minerals for a number of years, San Bernardino, with an area of 20,160 square miles. In this County are located the large silver and borax properties, so well known. It would be impossible for one to describe all the mining districts of San Bernardino County. It is enough, however, to give the names of the districts in which mining is being carried on. In the southeast is the Old Woman Mountains. North of these mountains we find the Sacramento, Exchequer, New York, and Trojan Mining Districts, or Providence Mountains, and, still farther north, the Clark District, to the west of which is the Solo Mining District. Directly south, and near the southern boundary of the County, the Twenty Nine Palms, Black Hawk, Ruby and Morongo Mining Districts are situated. Near the central portion is the Alvord, Ord Mountain, Calico and Grapevine Districts, where the silver and borax of Southern California are to be found, while to the west of these is the Silver Mountain or Oro Grande District. Directly north of this, and in the extreme northwest of the County, are the Slate Range and Brier Mining Districts. Enormous copper deposits have very recently been discovered within the boundary line of this County.

Los Angeles County is not considered a gold producing County, but some of the yellow metal is to be found in the Cedar Mountain Mining District, at Acton, also, around Newhall, San Gabriel and Palmdale. Great iron deposits are to be found along the San Gabriel Mountains. Petroleum, or crude oil, is the principal feature of the mineral wealth of Los Angeles County. The best possible description of this is obtained from Prof. W. L. Watts, in his speech before the American Institute of Mining Engineers, in the Los Angeles Chamber of Commerce, October 11, 1899. He said in part:

"The existence of petroleum in California has been known for many years. From time immemorial the California Indians used this mineral, in the form of asphaltum, for various purposes. In the early history of the State, the Catholic Fathers utilized it for roofing their missions and other buildings.

"It is said that in 1855 or 1856, Andreas Pico distilled petroleum on a small scale for the San Fernando Mission. He obtained his crude oil from Pico Canon, near Newhall, in Los Angeles County; and he was probably the first refiner of petroleum in this State. In 1856, a company commenced work at the La Brea Ranch, in Los Angeles County, and tried to refine the crude oil.

"In 1887, when the California State Mining Bureau made a reconnaissance of the petroleum industry of California, the only companies actually engaged in petroleum mining were: The Pacific Coast Oil Company, in Pico Canon, and the Puente Oil Company in the Puente Hills, Los Angeles County; the Hardison & Stewart Oil Company, subsequently incorporated as the Union Oil Company, of Ventura County; and McPherson & Co., were operating in Moody Gulch, in Santa Clara County.

"The first refinery that can be considered a commercial success was that of the Cali-

\* Paper presented to the California Miners' Association, in Convention, October 23d, 24th and 25th, 1899, at San Francisco.



fornia Star Oil Company, which was situated near Newhall in Los Angeles County, and managed by T. H. Scott. Subsequently, refineries were erected at Alameda, by the Pacific Coast Oil Company, and at Santa Paula by the Union Oil Company. At the present day there are refineries at Los Angeles, Chino, Ventura and Alameda, also at Oleum, in Contra Costa County, to which place the refinery of the Union Oil Co. was removed.

"During the last decade there has been a steady increase in the amount of petroleum produced in California, and in the amount of oil territory developed. In 1889, the output of petroleum for the State was 303,220 barrels; in 1898 it was 2,249,088 barrels, an increase of more than sevenfold.

"Oil yielding formations have been traced throughout the Coast Range, almost from San Diego to Del Norte County. North of San Francisco, no oil fields have as yet been developed, but prospect wells are being drilled at several places.

"In the Los Angeles oil field fully 1100 wells have been drilled, within an area of about two and a quarter miles in length and less than a quarter of a mile in width. Also, a western extension of that oil field is rapidly being developed about a mile to the westward of what has heretofore been known as the Los Angeles oil field.

"Although only a small portion of the California petroleum is available for manufacturing of illuminating oil, it can be resolved into other valuable commodities; it yields naphthas, gas, distillate, lubricating oil and asphaltum. The greatest value of California petroleum is that it furnishes an excellent fuel. Repeated tests have shown that for fuel purposes from two and a half to four barrels of crude petroleum may be taken as the equivalent of one ton of good coal, the ratio of value differing according to the conditions under which the petroleum is burned."

During the last four or five years, the mining industry of Kern County has experienced a great revival. In the older camps, such as White River, Kern River, Havilah and Caliente, the old mines are being reopened and operated by men of capital, and many of them will no doubt make steady producers.

Although the discoveries of placer gold in Goler, Red Rock and Summit have not been of much importance in themselves, they have attracted prospectors to that part of the county, and the discovery in May of 1895 of the Randsburg District is the result. This camp is so well known to the world, on account of its wonderful richness and the immensity of its ledges that it is unnecessary to dwell upon it. The Yellow Aster Mining and Milling Company have a most complete 30-stamp mill in operation, crushing ore, turning out gold bullion, and has paid in dividends some \$253,789 to September, 1899.

While Inyo County is north of the sixth standard line south, Southern Inyo is tributary to the metropolis of Southern California, and therefore I make a few remarks concerning the mining operations of that section. In the southeastern portion of the County along the Amargosa Creek and in the Kingston range, considerable mining has been carried on for years, gold and borax being found in paying quantities.

In the northern end of Death Valley, and along Furnace Creek a large quantity of borax of a good quality has been found, but on account of the long wagon haul, none of it has ever been sent to a market.

The Panamint range of mountains abounds with large low-grade veins of gold ore and a

few high-grade propositions. Ballarat in the last few years has rapidly come to the front, and is now a thriving little gold camp. Some gold mining has taken place just west of Post Office Springs, also in the Coso and Argus Ranges of mountains, while around Darwin and Ophir Mountain, silver and lead have been discovered.

The total area in Southern California where mining is more or less carried on, is in round numbers about 35,000 square miles. More than three-fourths of this territory is a plain, with patches of fertile land scattered here and there, like oasis upon a desert.

Considering the few years in which development work has been prosecuted, Southern California has shown a wonderful increase in her mineral production, and with more capital invested in our mines, we bid fair to out-rival any other section of the United States.

## CORRESPONDENCE

### ARIZONA.

(From Our Special Correspondent.)

CHLORIDE, Ariz.

Most of the lumber and timbering for the new Merrimac Concentrator is now on the ground at the mine, and Eli Hilty, foreman, is engaging quite a force of men in putting it in readiness for the machinery. There is an accumulation of ore on the dump awaiting the erection of the mill and concentrator. In the northwest and southwest drifts of the mine from the 300-foot level, the ores are fine and of a high grade shipping character.

Six feet of ore is reported in the Tennessee Mine that will average 100 ounces silver to the ton. Timbers are arriving for stopping in all the underground workings, which will necessitate the employment of a larger force of men than ever before and more than double the output.

Lately the management of the Elkhart Mine has changed the greater portion of its development work into contracting, but not lessening the number of men formerly employed. Much of this, however is new work, the company having decided to do several hundred feet of prospecting in the underground workings. Work continues, however, as formerly in the mine proper, and the ore output is as great as usual.

The Midnight Mine, which has been pushing through a 400-foot contract of development work for some time past, is passing through and cutting some fine streaks of high grade gold and silver ore in the northeast drift of the 200-foot level. The new work consists of a 200 foot shaft and northeast and southwest drifts of 100 feet each. During this time a great deal of ore has been hoisted that will average \$15 to the ton in gold, and, if water can be developed, suitable machinery and processes will be erected for its reduction.

Salt Lake capitalists are here looking at mines and prospects with a view of purchasing, and it is quite probable that two or three sales have been made, but no definite information can be obtained. If this is the case, the Redemption Mine is probably one of them, besides the Bryan and Distaff.

### CALIFORNIA.

ISABELLA, KERN CO., CAL., Nov. 2, '99.

EDITOR JOURNAL: While some of the miners in the higher mountains in this vicinity are closing down for winter, others at a lower altitude manifest renewed activity.

The Gilliam & Welch, just to the south-

west, has recently passed into the hands of San Francisco parties, since which time brisk development work has been going on, with a large body of good rock in sight.

The same parties purchased the Bryan Mine on the main contact. This mine is what has generally been called "The Blow Out." It is a body of quartz, iron stained and honeycombed, 200 feet between walls, 50 feet high, and nothing but vein matter. It has never been worked, being a mile from the most available water. It has generally been reckoned of low grade, and offering no chance to men of moderate means. Perhaps, however, no body of gold-bearing vein matter of the same size is met with on this coast outside of Alaska. It is supposed that a vein of equal proportions was worked to a depth of 300 or 400 feet by the ancients of South Africa.

The negotiations governing the Sierra Forest Reserve are beginning to revive the miners of Havilah to the necessity of employing some other power than steam, and there has been some inquiry after sites for electric plants on Kern River. A company of Los Angeles men located the power on Kern River for a distance of thirteen miles, from Kernville down, some five years ago, and for the last two years have had one man working on it a good portion of the time. But as the canal is to have a capacity of 700 cubic feet per second, it is surmised that he will not get it done until the beginning of the next century. In fact, he seems to be turning grey now, probably from the perplexity of answering questions. Most of the franchise privileges of this company were obtained on condition that they ran electricity into Los Angeles.

Since the above enterprise was inaugurated, a private company has constructed a ditch, taking the water out of the North Fork, above Kernville, and crossing the main Kern River at this place, eighty-five feet above low water. But few figures would be necessary to show that an additional investment of say \$10,000 would suffice to enable this ditch to furnish all the power Havilah needs. This must come sooner or later, for Havilah is destined to furnish deep mining for years yet.

The immense deposits of hematite iron ore in Kern County, will in time make a demand for the manganese of this section. In fact, if we had a railroad, we could ship, lead, silver, antimony, zinc, lime, marble, slate, and many other mineral products, as well as the great surplus of the products of the farm, to say nothing of what is now done, and what can be done in the production of gold.

STEPHEN BARTON.

### Virginia Dale District.

(From our special correspondent.)

SAN BERNARDINO CO., CAL.

EDITOR JOURNAL:—The cool weather has brought the people of this District back and the work is going on as it always does in the winter season.

Mr. Ingersoll of the O. K. Mine is back in camp and is having some timbers and a new ladder way put in the mine. The mine will be closed down a few days until this work is completed, but the mill will keep on running.

Ellerman & St. German of the Ivanhoe Mine are having a lot of ore milled at Dale. Their mill is not able to keep the ore out of the way. They have two eight-mule teams hauling ore to Dale. The ore from this mine



is of good grade and there is enough in sight to keep every mill in the camp busy for some time.

The Star King Mine is keeping its mill busy and could furnish ore for a much greater capacity.

Mr. Reynolds of Los Angeles and a Mexican have just located a new placer mine which seems to be very rich. DALE MINER.

## MEXICO.

(From Our Special Correspondent.)

TEPIC, Oct. 27, 1899.

The Valenciana Mine, in the Tatepilco District, has struck a very rich feeder in the crosscut on the first level, which assayed 1240 ounces of silver per ton. The company will put up a ten-stamp mill, which will be run by water power from a fall which is 375 feet high, only 800 metres west of the mine.

The Catarina Co. will also sell their ore, which is of a very high grade, to the Valenciana Co., and later on will put up a mill of their own, when the mine is developed enough to supply a 10-stamp mill.

The La Bagre Mine, situated in the Rio Grande de Santiago District, has a large force of men at work developing the property. This is a gold property, and has 27 feet width of ore running from one to one and three-fourths ounces of gold per ton.

Active operations have begun on the mines at Tateyusco on the lands of the widow of the late General Lepold Romano. These mines are very rich in silver and gold, and there will be a large mill erected to handle the ores from the four mines. The mines were worked and held by the revolutionists in 1870 and turned out quite a considerable amount of silver and gold, which was the main support of the revolutionists. They have been lying idle ever since the squashing of the rising.

M. B. King, a mining and civil engineer will soon depart for San Francisco to arrange for the purchase of mining machinery, also for an electric light plant for the city of Tepic. TEPIC.

## Miscellaneous Mining News.

### ALASKA.

#### Platinum in Alaska.

A. Flenner, an experienced miner from California, who with eight men has been prospecting along the shores of Disenchantment Bay, reports finding what he thinks will prove to be the greatest platinum field in the world. The place is about forty-five miles northwest from Sitka, and the platinum is not only very plenty in the sand but it is on the rock as well, though the rock is not in place. Mr. Flenner felt assured that he would find the ledge very soon and the whole party was enthusiastic, when the big earthquake and tidal wave of September 10th broke in upon them, destroyed their camp, washed away all their tools and specimens and left them in a wrecked condition. They managed to get back to Sitka after great hardships, and will return to their work in the Spring, with tools and machinery. They have five tons of provisions and supplies in cache. Gold in the ledge, in quantities to make hydraulic mining profitable, has been found in the neighborhood of the platinum, but the platinum is a richer find. Thus far, only traces of this metal have been discovered in Alaska, though it is generally believed from indications that large deposits of it exist.

## ARIZONA.

Waddell & McNulty have let a contract to James O'Brien to sink 100 feet on their mine on Copper Creek, Yavapai County.

The Dragoon Mining Company, operating the Peabody copper property at Dragoon Summit, has become one of the largest shippers of high-grade ore to the El Paso Smelting Works.

From Cherry Creek comes the news that the Eclipse Mining Company has opened up a large and rich body of gold ore in the shaft of the Dewey Claim. This company continues to send bullion to the Mint monthly. The Greenwood Mill and Cyanide Plant is in constant operation and is reported as paying.

Prof. Treadwell has closed the deal for the Cliff group of mines at Jerome, paying therefor \$16,000. This deal is much more important than it appears on its face, as the company that has made this important purchase has secured fourteen other claims in that immediate neighborhood and will commence extensive development work at once.

The option held by Messrs. Wood & Files on the Mohawk group of mines in Pine Creek District has expired, and Thomas Roach, owner of the mine, withdrew the papers. The mine is said to be looking well, ore of the value of \$22 per ton being exposed in the bottom of the shaft. Messrs. Wood & Files have three or four other properties in the County which they are developing.

## CALIFORNIA.

### AMADOR COUNTY.

The Jackson-Butte Mining Company has had work resumed on its mine south of Butte Mountain, near Jackson, after a shut-down of several months. The work is all being prosecuted under the superintendency of R. L. Marsh, the original promoter of the development of the property.

The Crown Point Mine at Butte City has been rebounded to an Eastern company by the owner, Tony Mello. One-half of the purchase price has been paid and the balance is due in one year. Active development operations will be commenced in about ten days.

The milling of ore from the Central Eureka at Sutter Creek still goes on at the Zeila Mill, and it seems that its product will be greater than from the last crushing. According to B. F. Taylor, the millman, the ore then crushed was the best he ever milled.

### EL DORADO COUNTY.

Work on the Stillwaggon Mine at Omo will soon be resumed.

Several men are engaged in driving a tunnel on the Coloma mine, at Omo, to prospect for gravel.

The force at the Mt. Pleasant Mine, Grizzly Flat, is being increased as rapidly as room can be made for additional men.

The Spreckels & Mulkey Mine at Cedar Grove has finally closed down. They have decided that it will not pay to work it any more.

At the copper mine near Pilot Hill, a number of men are employed putting up buildings and opening up the mine. It is claimed that the ore goes 40 per cent copper and \$15 per ton gold.

### CALAVERAS COUNTY.

It is reported that active operations are to be resumed in the Blazing Star Mine, near West Point. Extensive development work

has been done down to the 400-foot level. If this report proves true, a great boom will take place in that district, as the mine is thoroughly equipped with mill, chlorination works and a cyanide plant, and would require a large force of operators.

On the Demarest Mine, near San Andreas, work is being pressed in the winze and some rich ore is being taken out. The negotiations with Mr. Stickle are still pending.

The Blair Gold Mining Company has sold its Maggie Bell quartz mining claim, located in Angels Mining District, to the Libra Mining Company.

The well-known Cramer Mine at Mokelumne Hill has been sold to Denver capitalists. Active operations are to be commenced in about ten days under the superintendency of J. Carpenter.

### FRESNO COUNTY.

Reports from Fresno state that the Copper King Mine, which is situated about 14 miles from Sanger, has 20,000 tons of ore on the dump ready for the mill. This is the property which was sold by H. B. Vercoe in London last January for \$1,750,000, and reports since received from London go to show that the purchasers are quite satisfied with their bargain. The mine has a 10 horse power hoisting plant, and it is believed that reduction works will soon be erected.

### INYO COUNTY.

Indications are that the Western Borax Company, which has succeeded to the Conn & Trudo interests in Saline, will work those fields on an extensive scale. The company has purchased the old Mammoth Mill boilers from J. S. Cain, and will soon have them taken over. It is anticipated that several additional teams will come into service hauling borax out to Alvord.

Messrs. Geraux, Phylar and Stewart, representing Pennsylvania capital, have made an arrangement with Messrs. Barnes & Anderson for the purchase of their gold mine near Citrus. The terms of the agreement are as follows: Each owner is to receive \$100 a month for a year and \$60,000 for the mine with improvement, at the expiration of the year. If the Los Angeles parties who are interested do not buy the Hirsch Mine, it is probable that the above mentioned gentlemen will purchase it also.

### KERN COUNTY.

Wm. Caplinger, who was in Garlock two years ago, is now there representing Eastern capital, and is negotiating for two or three copper properties.

Asa Rhodamacher reports that the litigation which has kept his Garlock mine in the background for three years is about to be settled out of court.

W. H. Brigam is at work with three men on his property near El Paso Peak, and is taking out fine smelting ore.

The last store in Garlock has moved to Randsburg and the Henry Mill was moved to Kingman, Arizona, last week by Messrs. Pickering & Tittle of Los Angeles.

F. H. Heald has bought the H. C. Lee group of mines at Garlock, and is taking out a carload of ore to ship to Selby's.

Messrs. Sitey & Sailor have sold their claims in Copper Basin to a rich company who intend putting in a matte furnace. They have purchased the old Boden Hotel property at Garlock, and with it are building houses and shops at the mines.

The sale of the Exposed Treasure Mine



near Mojave, Cal., to Telfair Creighton of Los Angeles is reported. The Exposed Treasure has long been known as one of the most valuable properties in Mojave District, and the carloads of oreshipped from it to San Francisco for treatment have invariably given good results. The sale carries with it the Yellow Rover, Golden Carrier, Justice and the Exposed Treasure Extension, forming a group. The price is stated to be \$40,000.

#### MARIPOSA COUNTY.

The machinery for the mines of the Mariposa Commercial and Mining Co. has begun to arrive and is being placed in position. An 80-horse-power boiler is already up.

Development work on the mines is being pushed vigorously, and as soon as everything is in condition bullion will be turned out in large quantities.

#### SAN BERNARDINO COUNTY.

The Iron Chief Mine, in the Eagle Mountains, is rapidly developing into one of the largest producers in the desert country. Not many mine owners fall up against the good fortune of having a complete plant presented to them, but that happened to the men who had developed the Iron Chief, and who are now taking out gold bullion every month. The owners are Monroe Stewart, T. J. Dofflemeyer, Joseph Beach, W. D. Stephens and Jack Moore.

When these lucky owners bonded the mine and received a certain sum in payment, the deal was supposed to be closed. But the \$135,000 in addition as the purchase price was not made good. In the meantime the new owners put up a 60-ton cyanide plant, four gasoline engines, 17 miles of pipe line, the whole forming as complete a plant as could be desired. While these improvements cost \$80,000, the bonders took out \$100,000.

The mine is down over 150 feet, with several levels. The ore averages \$16 or \$17 to the ton, and the ore body four or five feet in width. Some of it runs as high as \$50 and \$60, but this is exceptional.

#### SAN DIEGO COUNTY.

Mr. Shelhamer, manager of the Mt. Beauty Mines, says that he has ordered a 4-stamp mill of the latest pattern, and will erect it at the Mt. Beauty Mine in the Oak Grove District. Mr. Shelhamer believes that the Oak Grove Mines are on the same lode that runs through Cahulla, Kenworthy and Tauquitz, and that the same mineral vein can be traced out on the desert to Dale, Grapevine and on to Kramar, Randsburg and the Johannesburg.

#### SHASTA COUNTY.

The title to the Balaklala mining property in the Flat Creek District is clear. Now the four months' option held on the claims in the sum of \$200,000 by Nova Scotia parties, represented by W. A. Temple, can be made operative.

The numerous owners in the Balaklala a long time ago gave power of attorney to Sig Weil and A. C. Ellis. As the story is told, these two transferred the stock to Mineer, and other transfers were made ostensibly in good faith for the interests of the property. Their action caused trouble and the suit of Barney Conroy and many others against A. C. Ellis and others to have the transfers set aside resulted.

#### SONOMA COUNTY.

Within a stone's throw of the country road, passed and repassed daily by hundreds of travelers during the past twenty years, on the Calistoga road on upper Mark West creek, a short time since was uncovered a vast deposit of steatite or silicate of magnesia. E. F. Heath, a Santa Rosa metallurgist and assayer, while enjoying a day's outing in that vicinity, found specimens of float that attracted his attention, and as a result of a second visit he discovered a clearly-defined ledge, thirty-five feet wide, and, where cut through by a ravine, it was over twenty feet in height. Traced along the surface, the vein cropped out here and there for nearly a mile, showing that there is practically an inexhaustible supply of the product. The deposit is foliated, opaque and principally of a creamy color, varying in some cases to a delicate turquoise. In the exposed face of the vein, a variety of colors as well as grades of hardness were found in the succeeding strata. Some clear white, a pure talc and entirely free from grit was pronounced a most superior article for jewelers' use.

In the center of the vein, however, was found a strata which has been pronounced to be a most excellent quality of "lava," the commercial term applied to the substance from which gas burners are made. In this field alone there is an immense demand for the substance, as the only known deposit of a suitable grade to work advantageously is near Chattanooga, Tenn., and comparatively limited in extent.

Samples of this "lava" submitted to a number of the large supply houses and manufacturing centers, both on this coast and in the east, brought forth numerous inquiries as to the location of the discovery and the amount thereof, and the highest praise as to the quality. Worked in a lathe it may be fashioned into almost any conceivable form, does not dull tools, and the finest holes may be drilled with ease and without a fear of their chipping out. A large sample sent to an eastern factory devoted to the production of electrical goods, brought back an almost immediate reply asking for a ton.

Realizing the coming value of this deposit, already capitalists have been in town trying to get a bond on the property upon which the vein is located, but the owner, knowing the value of his property, has refused all offers, both for bond, sale or lease, and will probably, after opening it up well, fix a stated price per cubic yard, and allow any one to quarry it. His idea is that he can realize more in this way than by selling it for a lump sum, and thus giving some firm a monopoly.

#### TUOLUMNE COUNTY.

The cross-cut tunnel on the Esperanza Mine in Sonora has been driven 150 feet, just one-half the distance to the vein.

A contract has been let for sinking a winze on the old Smith Mine, located one-fourth of a mile south of the Dead Horse, near Sonora.

The Bonito, located between the Consuello and Grizzly at Sonora, and owned by trustees of the Fair Estate, will shortly be worked.

In the famous Bald Mountain Pocket Mine on the Mother Lode the 100-foot upraise is nearing the surface, there being but ten feet further to go. When this is through the mine will be splendidly ventilated. The work of cross-cutting the foot-wall will be commenced.

#### COLORADO.

The machinery in the Economic Extraction Mill in Eclipse Gulch, El Paso County, is all in position and fires have been laid under the great boilers. During the next five or six weeks the process and the plant will be thoroughly tried, and the success or failure of the project demonstrated.

At the very first the mill will be subjected to a severe test—namely, the treatment of low-grade rock from the dump of the Gold Coin mine. If this rock can be successfully and profitably handled the success of the enterprise will be assured and the popularity of the process immediate.

#### Cripple Creek Items.

The Mollie Dwyer has a showing at only 38 feet from the surface of four feet of ore that samples \$200 per ton.

Morning Star at the 150-foot level has cut a four-foot vein of high-grade ore.

From the Magner lease on the Minnie Bell, adjoining the Hull City Placer, there was recently sent out 40 tons of ore, half of which had a value of 20 ounces, and the remainder was \$40 rock.

A company has been organized on the Big Mule, May and Stray Horse claims on Carbonate Hill, the Marguerite on Gold and the Fulton on Raven Hill, and is known as the Fulton-Marguerite Co.

The output of the Portland for October has exceeded all previous records. It aggregates 5,000 tons of a gross value of \$300,000. Stopping has just begun at the 900-foot level where the ore carries improved values. Everything is in readiness at the mine to resume shipment. The volume of water in the mine is decreasing and the pumps are now raising from 700 to 800 gallons a minute only.

Thirty-three ounce gold ore has been shipped from the Last Dollar.

Forty-dollar ore is being run through the new machinery at the Lost Lily.

Horan & Horan are taking out about 15 tons a day at present from their lease on the Deadwood.

#### IDAHO.

A concentrating mill is being erected on the Sixteen to One Mine near Wallace, Idaho, and is expected to be ready for business in the course of a month. It will be equipped with four double deck Wilfleys, so it is said, and a Huntington mill for the grinding of tailings.

The Bannock Dredge Company is still at work prospecting the bed of Payette River above the Wetzel bridge. The gravel varies in depth from 12 to 30 feet. Six holes have been sunk. Two more will be put down near the bridge. No one outside of the Company and those engaged in the work knows anything about the value of the gravel beyond the fact that the prospects are satisfactory. A dredge will be put up next year.

A fine strike in the Middleman Mine, at Willow Creek, Idaho, is reported. The strike is said to have been made in extending an old drift which runs from the bottom of a 25-foot shaft. The lead is two feet wide, of which from two to six inches is reported as carrying 20 per cent lead, 5½ ounces gold, and 105 ounces of silver to the ton; about 12 inches carries 5 ounces gold, 7 per cent lead and 19 ounces silver.



## MICHIGAN.

Wonderfully rich ore has been encountered in the "C" shaft of the Michigan Mine at Rockland, Ontonagon County, and all the openings are presenting a splendid appearance.

Iron ore shipments from the Gogebic Range passed the record of the season of 1898, during the past week, and the unequalled shipment of 1892 is liable to be reached before navigation closes. The shipments via Chequamegon Bay docks to Oct. 23rd, amounted to 2,394,262 tons, to which must be added the tonnage sent to local furnaces and to the docks at Escanaba. The following mines have contributed to the increase noted at the corresponding period in 1898: Ada, Cary, Mikado, Montreal, Newport, East Eorrie, Pabst, Sunday Lake, New Davis and Tilden. The season's total shipments to date are close to 2,600,000 tons.

The Chapin Mining Company is engaged in enlarging the stock docks at the Hamilton and Ludington shafts at Iron Mountain very materially, which indicates a purpose on the part of the management to mine considerable more ore this winter than last. The last of the stockpile ore was shipped to Escanaba recently.

## MINNESOTA.

## The Lake Region Iron Mines.

Mahoning Mine, at Hibbing, Mesaba Range, has closed down for the season with a total shipment of 750,000 tons. This makes over 2,000,000 tons for this mine since the spring of 1895, when it was first opened. A one-fourth interest has been sold to the American Steel Hoop Company of Pittsburg for a large sum, and this company will take about 250,000 tons of the ore next year. The mine will probably ship about 1,000,000 tons in 1900. It is a steam-shovel mine and one of the largest in the world.

Fayal Mine, Mesaba Range, will close the season with a shipment of over 1,000,000 tons, and will probably lead all mines of the Lake Superior country. It is a property of the Federal Steel Company.

The Oliver (Carnegie) Company has closed some of its mines for the season on account of high freights, and will send out little more ore.

The Aragon Mine, Menominee Range, has put in a complete system of compressed air for handling its ore cars underground, doing away with man or mule tramping.

It is reported that an output of 20,000,000 tons of ore is to be attempted next year. Such an increase over the present year is an impossibility unless many more men can be secured on all ranges. The 1900 output is not likely to be over 18,000,000 tons and this will be double what was ever mined in one year prior to 1895.

The various mining and transportation companies have already secured ships capable of moving 18,000,000 tons. In no preceding year has chartering of tonnage taken place before February or April, and the chartering of 10,000,000 tons last February was unprecedented. The question of ore prices is not usually raised before the beginning of the new year, but this season it is likely that at least 15,000,000 tons will be sold and placed before the last of this year's ore has gone forward.

Timber is being received at Duluth for the new ore dock of the Eastern Minnesota road.

It will be the highest and widest in the world, with the largest capacity per pocket. It will be seventy-three feet above water and sixty feet below, and sixty-five feet wide, and will have 70,000 tons storage capacity. It will rest on 14,000 long piles, and 15,000,000 feet of fir timber will be used in its construction. Purchase of the material for its construction has swamped the mills of the North Pacific and exhausted the immediate pile capacity of the pine woods of Minnesota and Wisconsin.

## MISSOURI.

A combination known as National Lead and Spelter Company, with a capitalization of \$10,000,000 and a surplus of \$50,000, to control and work large interests in the Joplin, Galena, District, has been formed. As a result of the organization, lead and zinc stocks will be listed on stock exchanges of New York, Boston and Chicago.

The Continental Zinc and Lead Mining and Smelting Company has purchased, it is stated, a 17-year lease of the Silver Moon Mine adjoining the Silver Dick Mine in Oronogo, and has ordered a 125-ton mill, a large pumping plant and air compressor. The mine is opened by two shafts each 110 feet deep connected by a drift.

## MONTANA.

The returns from Lupter & Wilkey's car of ore, 18 tons, taken from a lease on the Clipper Mine, at Pony, Madison County, amounted to a little more than \$2,000 net. This has been taken out since the 1st of July. In the latter part of June they made a shipment of 62 tons that netted them a little better than \$2,500. In addition to this they had milled at the Clipper Mill recently 200 tons of ore which, including the concentrates, cleared them \$2,200. Their shipment last March amounted to more than \$4,000. This only amounts to \$10,700 taken out of one lease in less than a year by two men.

The semi-annual report of the Drumlummon Company, whose property is at Marysville, has just been made for the first half of the year 1899. This Company has two stamp mills, one of 50 and the other of 60 stamps, both located just at the mouth of the tunnel, through which the ore is extracted. The report shows that the 50 stamp mill was in operation during the entire half year, reducing 21,822 tons of ore, while the 60 stamp mill was run until May 31, and reduced 15,830 tons of ore, making a total of 37,652 tons. If both mills were run at about the same ratio to their full capacity, this indicates much greater effectiveness in the 50-stamp mill than in the one with 60.

The 37,652 tons of ore crushed represents the total output of the mine, the value of which, as shown by the returns, is given at \$239,987.35, an average of \$6.37 per ton. The total expense of reduction is shown to have been \$221,956.91, equivalent to \$5.89 per ton, and leaving a net profit of \$18,030.44.

At the cyanide plant, some four or five miles down the canyon, from the 18th of April to the 30th of June, 28,459 tons of tailings were treated, the average realization being \$3.41 a ton, and the total footing up \$97,144.17. The expense of treatment was \$49,473.95, an average of \$1.75 per ton, giving a net profit of \$47,400.22, on a run of two months and twelve days.

## NEVADA.

The Pickett group of mining claims in the Deer Lodge District, Nevada, has been bonded to R. C. Lund and associates, the final consummation of the deal having been just made. The consideration could not be learned, but the owners of the property, Col. H. L. Pickett, Adam Clark and W. T. Troutman will receive an amount running well into the thousands of dollars. The property consists of ten claims, which were among the first located in the camp, and they are considered to be very valuable.

Among the claims bonded to Mr. Lund and his co-partners are two which deserve special mention—the Log Cabin and the Indiana. The Log Cabin is covered by the townsite of Deer Lodge, and aside from its mineral-producing possibilities, it holds the principal water supply of the camp. This claim is also an extension of the Homestake property, recently bonded by Messrs. Lund and McCune, and upon which an active campaign is now in progress. The Indiana is said to have exposed within its boundaries the largest quartz ledge in the camp, and free gold in liberal quantities is shown in the surface croppings. Those familiar with the geological conditions of the Deer Lodge District are of the opinion that the Pickett group is one of the most promising propositions in the district, and now that Mr. Lund and his associates are to undertake its exploitation, important results are expected.

A large force of men is employed at the Homestake, and among the permanent improvements now under way is the erection of a large steam hoist, capable of carrying the present working shaft to great depth. No one doubts but the Homestake will make a great mine, and there is every reason to believe that the Log Cabin and the other claims which go to make up the Pickett group will make another bonanza.

Colonel Pickett still retains his Deer Trail property in Pike's Diggings, and other interests at Stateline, and upon these he expects to concentrate his efforts in the future.

## NEW MEXICO.

The Cooney Mine, at Cooney, Grant County, New Mexico, has been sold to Colorado Springs capitalists, for \$50,000. The new owners will install first class machinery upon the mine and make extensive additions to the milling capacity of the plant.

Jos. Schlosser continues to develop rich copper ore upon the Humboldt Mine, at Hanover. The last shipments of a carload each demonstrated that the ore is high grade.

Burns and Brinkman shipped a car of good copper ore from their Colorado claim, near Hanover.

Ed. Baker has made a big strike on the Emma Mine, at Hanover, owned by the H. W. Hutchinson estate, and which he is working under bond and lease. The ore was encountered at a depth of 40 feet and is developing into a big mine.

On the Confidence Mine, Mogollon District, the work of sinking upon No. 2 shaft still progresses, with large bodies of a very good grade of ore in all the lower workings.

Operations at the Last Chance Mine and Mill, at Mogollon, have been temporarily suspended, Mr. Ernest Craig, the manager in charge, having completed the test run of 2,500 tons. The ore has proved fully up to expectations in value.



## OREGON.

Preparations for heavy placer mining operations in the Southern portion of Douglas Co. are in progress. At Tennessee Gulch, Starveout and other points about the head of Cow Creek, old ditches are being deepened, flumes renewed and headgates strengthened for the purpose of taking advantage of all the rain that falls. The same activity prevails at the Victor, the Crackerjack and the Cain placer mines, on the lower creek. Miners look for unusual activity among the Douglas County placer mines during the ensuing Winter and Spring.

Indications for renewal of operations at the nickel mines near Riddle are good, as several hundred tons of the ore are now being prepared for shipment to Chicago as a test of its value. These mines have been closed down nearly five years, though at one time 150 men were employed, and an expensive plant had been erected. Resumption of work will be hailed with delight by the citizens of the growing town of Riddle.

## SOUTH DAKOTA.

The Detroit & Deadwood Mining Company of Detroit has crosscut the ledge of ore in the City Creek copper property, in the city limits of Deadwood, and it is found that there are 31 feet of ore which will average \$8 a ton gold, 3 per cent copper and about \$20 in nickel. The nickel properties in the mine will form an important item in the working of the mine. It is the first time that nickel has been discovered in the Black Hills in paying quantities. The tunnel in this property is now in about 425 feet, and the Company feels satisfied that the ore veins have only commenced to appear and that the wide copper ledge will be encountered when the tunnel reaches a depth of about 700 feet.

A rich vein of ore has been encountered in the Big Four Mine, in Deadwood Gulch, which is being worked by parties residing at Hamburg, Iowa. J. W. Dalby is general manager. The ore averages well and the vein is going to be followed in.

## UTAH.

The Haggin-Hearst Syndicate holdings in the Daly-West Mine at Park City have been bonded to J. E. Bamberger, presumably for the Guggenheim Exploration Co. This will give the clients of Mr. Bamberger control of the property. The price agreed upon was on a basis of \$2,000,000 for the property, or \$13.33 1/3 per share.

John T. Hodson of the Tesora, and extensively interested in other properties in Eureka and the Diamond end, is visiting Mark Hopkins, resident Manager of the Tesora Company's affairs at Silver City. Mr. Hodson will inspect the Tesora and also size up the big May Day bonanza, in which he is personally interested. Speaking of the May Day, Mr. Hodson said that their new plant will cost between \$15,000 and \$20,000, including every modern mechanical device and a full complement of power drills.

It is reported that the Gold Dust, at Mercur, will soon pass into Capt. De Lamar's hands and become a part of the Great Golden Gate, which it adjoins. The Gold Dust is being developed and is showing up very well. Overtures from the De Lamar Company have previously been made with a view to getting the property, but the terms could not be

agreed upon. Now, it is understood, the Gold Dust Company will be willing to give an option on a basis of 25 cents on the share, and it is thought likely a deal will soon be made.

Speaking of the present showing and the general grade and character that the ore has maintained in the Ajax Mine at Mammoth, Thomas Weir said that the last lot sent to market, from which they had received returns, sampled very satisfactorily, especially in copper values. For some time he had been considering the advisability of sinking below the 700-level and considerable prospecting is being done now on that level to determine the policy of such a step. Two winzes are now being sunk and in one of them a small ore chute has been encountered which gives them a marketable article, carrying copper, gold and silver values, making it better than \$40.

The \$4,000,000 contract between the American Smelting and Refining Company and the Centennial-Eureka Mining Company of Eureka for the reduction of the latter's ore having been ratified upon the arrival of Hon. William H. Coolidge of Boston in Salt Lake City, the management will now direct its efforts to arranging for energetic extraction.

## WASHINGTON.

The site for the Bunker Hill Mill, on the Pend d'Oreille River has been graded. Its ground dimensions will be 30x70 feet. Four cabins and other buildings have been constructed, and the place begins to look like a small village. The right of way for the tramway and flume have been surveyed and cleared. A ten-stamp mill has been purchased from Fraser & Chalmers, and is of the wet crushing type. It will be provided with a Blake Rock crusher, 10 stamps and three frue-vanners. The latter will be used to concentrate the tailings after they come from the plates. This plant is on its way from the east now, and it is anticipated that it will be ready for operation by the first of January. Operations on the mine have temporarily ceased, but the intention is soon to start a tunnel which will tap the vein at a point 100 feet below the present workings.

## FOREIGN MINING NEWS

### BRITISH COLUMBIA.

#### Shipments of Rossland Ore.

The ore shipments for last week are over the average, 5,175 tons approximately having been sent down to the smelters during the preceding 70 days. The Le Roi easily heads the list with 2,400 tons, a daily average of more than 342 tons, a very fair showing under all the circumstances. The War Eagle, which sent down 2,325 tons the week previous, fell below the 2,000 mark this week, to 1,950 tons. The combined output of the War Eagle and Centre Star for the week was 2,610 tons. The Coxey appears in the list for the first time, 350 sacks of sorted ore, or about 20 tons, having been sent to Northport. This shipment has been expected for some time, but the want of water at the mine has made the ore sorting slow work.

The I. X. L. shipped another carload of 25 tons during the week. Supposing the ore to run in values about the same as the initial shipment, namely \$42, the shipment made

will represent about \$1050. The Iron Mask sent out four carloads, or 120 tons, somewhat less than the previous week.

It will be noticed that the total reached for the week of 5,175 tons means a daily average output just a fraction under 740 tons. The estimated shipments for the year to date now reach the respectable sum of 138,682, with a little more than two full months yet to complete the year. Up to the same date last year the output was about 95,500 tons, while the total output for the year was placed at from 125,000 to 130,000 tons. With reasonably good luck the output this year should exceed 175,000 tons.

Of the week's output the Northport smelter obtained 2,445 tons and 2,730 tons were sent to the Canadian Pacific smelter works at Trail.

## LOWER CALIFORNIA.

The 10 stamp mill of La Republica Gold Mine, 45 miles east of Ensenada is at work on ore assaying \$5 in free gold and \$10 sulphates from the 600-foot level. L. A. Wright, a lawyer of San Diego, is the owner.

## MEXICO.

Ground is rapidly being prepared for the site of the new mill projected by the Esperanza Company at El Oro. This is to be of 80 stamps, which, with the 40 now in use, will give the Esperanza Co. the largest stamp mill in the Republic. August Sahlberg, General Manager, recently returned from the United States, where he had placed the order for the required machinery.

The new 100-stamp mill of the American Mining Co. at El Oro is rapidly approaching completion, and it is stated on good authority that the entire set will very soon be dropping. The plant which, up to date has cost over \$600,000, silver, was most ably planned and its building superintended by D. M. Hayner.

## Latest Mining Decisions.

Prepared by Andrews & Murdoch, Berrien Springs, Mich.

The rights of a foreign corporation to engage in business in another State depends upon the comity of that State, and this comity is again limited by the public policy of the State, which may be inferred from its general attitude with regard to such corporations, or may be positively declared by statute. Williams vs. Gold Hill Mining Co. et al., 96 Fed. Rep. (U. S.) 454.

The decisions of the Supreme Court of California holding that judgment creditors of a mining corporation may question the validity of a mortgage given by the corporation on the ground that it was not ratified by the stockholders, as required by the State statute, do not relate to any question of commercial or general law, but are local in their effect, and are binding on a Federal Court. Williams vs. Gold Hill Min. Co. et al., 96 Fed. Rep. (U. S.) 454.

The State of California having declared its public policy by its Constitution (Article 12, § 15), which provides that "No corporation organized outside the limits of this State shall be allowed to transact business in this State under more favorable conditions than are prescribed by law to similar corporations organized under the laws of this State," and having provided by Statute (St. 1880, p. 131), applicable by its terms to all mining corporations, that "It shall not be lawful for the di-



rectors of any mining corporation to sell, lease, mortgage or otherwise dispose of the whole or any part of the mining ground owned or held by such corporation \* \* \* unless such act be ratified by the holders of at least two thirds of the capital stock of such corporation," and prescribed the manner in which such ratification must be shown, a corporation of another State, holding mining ground in California, is governed as to its conveyance or incumbrance by such statute, and a mortgage thereon, not ratified by its stockholders in the manner prescribed, is void. *Williams vs. Gold Hill Min. Co. et al.*, 96 Fed. Rep. (U. S.) 454.

## GENERAL NEWS

The Joseph Dixon Crucible Co., of Jersey City, N. J., have issued a pamphlet concerning the use of Dixon's Ticonderoga Flake Graphite for cylinders and valves. Oils are not entirely satisfactory, especially where high pressure and superheated steam are used. It seems to be generally conceded that for lubricating purposes a mineral oil is every way preferable, excepting that it lacks body, and in order to get the desirable body animal oils are added; the consequence is that the high heat and steam now used are apt to char the animal oils and form a gummy or sticky mass on cylinders and pistons, even though the surfaces look clean and dry. Careful experiments seem to fully demonstrate that a finely ground flake graphite furnishes a better body for mineral oils than any of the animal oils, and at the same time is not affected by any degree of heat, and moreover it fills up the microscopical inequalities of the bearing surface, making an ideally smooth surface.

Regarding Cling-Surface belt dressing Prof. Carpenter, of Cornell University, writes the manufacturers the Cling-Surface Mfg. Co. 167 172 Virginia Street, Buffalo, N. Y., under date of October 5th, 1899, as follows:

"Later tests of the use of Cling Surface on belting substantiate in every particular the statements made in my report of April 17th. They also indicate higher efficiency of transmission and less loss of power in the case of belts treated with Cling-Surface than in the case of belts not so treated, when working under the conditions prevailing at the time of the earlier test. This is due to the fact that slipping of a belt causes considerable loss of power, the power so lost passing off in heat. The use of Cling-Surface reduces the slipping and consequently the loss of power occasioned by the use of belts that slip.

"During the past six months I have had occasion to observe the practical use of Cling-Surface in a number of instances. In all such cases Cling-Surface has improved the belts by softening them, and as far as I can determine in the limited time (seven months) tends to preserve the leather of which they are constructed."

Catalogue No. 10, published by the Jackson Drill and Manufacturing Company of Denver, Colo., is a 16 page pamphlet with numerous illustrations showing the points of excellence of the Jackson hand rock drill. The machine is said to be so light and simple that it can be easily handled by one man. The number of blows, their force and length of stroke can be quickly varied, and the machine is stated to work without any jar to the miner. Holes

can be spooned and long drills changed without disligning the machine. The Company states that the drill has now been on the market two years. A long list of references and testimonials given, substantiating all claims made.

A significant fact in the Pennsylvania iron trade is that the Thomas Iron Company, Catasauqua, has just received an immense consignment of ore, said to have been over 300,000 tons, from Nova Scotia. The company has of late been taking native ores from the Lehigh Valley. The foreign ore is to be used at Catasauqua and Albutis.

## PERSONAL NEWS ITEMS

W. J. SCHIEFFELIN of New York has agreed with Mrs. R. O. BUTTERFIELD and N. G. DOUGLAS to buy annually from 400 to 2,000 tons of lepidolite from mines near Pala, San Diego County, Cal.

PROF. LAIRD J. STABLER of the University of Southern California read a paper and gave a lecture on the Metallurgy of Gold, illustrated by stereopticon views of mines and mining machinery, and treating of the physical, chemical and commercial properties of gold, before the Southern California Academy of Sciences in Los Angeles, November 14th, 1899.

LEW E. AUBURY, E. M. of Los Angeles, Cal., will leave for Chloride, Arizona, in a few days.

PROF. W. L. WATTS has returned to San Francisco, Cal., from a visit of several weeks in the Los Angeles, Cal., oil fields.

PRES'T. W. H. EDGAR of the Dearborn Drug & Chemical Works, Chicago, has returned from a business visit to Honolulu.

E. H. BENJAMIN, Secretary California Miners' Association, left San Francisco, Cal., on a two months' trip to Port Dick, Alaska.

F. L. SUTTERMEISTER, Treasurer of the Spokane Stock Exchange and Treasurer of the Mudgett-Routhe Company, of Spokane, is at present in New York for the purpose of placing some mining properties.

THOMAS J. HURLEY, Treasurer of the Exploration Syndicate, of New York, has been elected Vice-President of the Briquette Coal Company, whose 200-ton plant has recently begun manufacturing compressed coal at Chicago.

W. S. EDWARDS, formerly General Manager Silver King, M. Co. Ltd., of London, is in New York City.

D. C. JACKLING, of Salt Lake City, Utah, is cyanide experimenting on ores of Republic, Wash.

COL. GEORGE W. E. DORSEY, has returned to Utah, from a recent trip to Boston and New York on mining business.

ROSS E. BROWNE is devoting much time to a study of economic conditions at Tintic, Utah. He is one of the experts on behalf of the Grand Central in its action against the Mammoth trespass.

L. C. TRENT has returned to Salt Lake City, Utah, from a business visit to California.

FREDERICK G. CORNING, President of the Exploration Syndicate, of New York, left last week for Mexico, to examine the mines at Zacatecas and Guanajuato operated by the Syndicate.

W. G. DODD, of the Union Iron Works of San Francisco, has returned to that city from a four months' trip to China, Japan and Korea.

ROY D. HUNTER, Colorado Agent Sullivan Machinery Co., has returned to Denver from Salt Lake City, Utah.

A. S. WRIGHT of Denver has been in Idaho and Montana, looking up mining properties.

M. I. NEWHOUSE, of London, is investigating Utah mining and smelting conditions.

W. A. CARLYLE, late of the British America Corporation, will leave for Europe early in December.

H. G. MURRY, late Superintendent Lightner, Cal., mine has gone to Korea in the employ of an Oriental mining corporation.

C. E. WATSON, of Carson, has been appointed Superintendent of the Alamo M. Co., in Antelope Valley, Mono county, Cal.

SIDNEY FISHER, Dominion Minister of Agriculture, and Mr. Hewitt Bostock have been making a tour of the Kootenay District. Mr. Fisher has charge of the mineral exhibits for the Paris Exposition.

R. U. GOODE of the U. S. Geological Survey is superintending topographic work at Bingham, Utah.

CHARLES C. JONES, who has been engaged in gold mining in White County, Ga., is now consulting engineer for Mr. Edward N. Breitung of Marquette, Mich., and has examined some gold properties in Southern Wyoming.

DR. A. R. LEDOUX, of Ledoux & Company, New York City, has just returned from examining some copper deposits in Nova Scotia, and has gone to North Carolina to examine the mines of the Union Copper Mining Company, near Gold Hill.

## NEW INCORPORATIONS IN THE MINING AND METAL INDUSTRIES.

### COLORADO.

Copper Star Mining Co., Boston, Mass. General mining business. Capital, \$500,000. Incorporators: E. B. Estes, of Brockton; J. C. Emery, H. F. Cottle, F. C. Hyde, W. L. Davis, F. H. Collis, all of Boston; J. Houghton, of Lynn, Mass.; W. F. Plogg, of Missositt, Me.; J. Remby, of Gloucester, Mass.

Victor Fuel Co., Denver. General mining business. Capital, \$2,500,000. Incorporators: D. A. Chappell, M. Jones, C. Yeaman, W. B. Cunningham, T. S. Skinner, all of Denver.

Sioux Falls & Cripple Creek Gold Mining & Development Co., of South Dakota, Cripple Creek. General mining business.

American Steel & Wire Co., Chicago, Ill. Manufacture and sale of steel and wire. Capital, \$25,000. Incorporators: O. B. Barrows, of Denver, Col.; Ira J. Paddock, J. H. Blood, both of Chicago, Ill.

Pine Shade Gold Mining & Milling Co., Idaho Springs. General mining business. Capital, \$50,000. Incorporators: J. J. May, S. Moritz, E. L. Regemitter, all of Idaho Springs.

Beacon Hill Ajax Gold Mining Co., Colorado Springs. General mining business. Capital, \$1,250,000. Incorporators: J. R. McKinnie, R. P. Davis, W. P. Mazy, J. W. Graham, J. T. Burkholder, all of Colorado Springs.

Red Oak Gold Mining & Milling Co., Denver. General mining business. Capital, \$125,000. Incorporators: M. Bonham, B. Bonham, A. B. Montgomery, all of Denver; Alice Teagarden, C. Teagarden, of Boulder.

Consolidated Copper Mining, Milling & Smelting Co., Denver. Mining, milling and smelting of copper. Capital, \$2,000,000. Incorporators: J. B. Johnson, Lucy F. Johnson, C. Rockhill, C. M. Hunt, I. E. Barnum, all of Denver; C. M. Munson, Mary E. Holland of Boulder.

The Block Ten Co., Victor. General mining business. Capital, \$50,000. Incorporators: E. L. White, A. F. White, W. R. Marshall, all of Victor.

Nellie V. Gold Mining Co., Colorado Springs. General mining business. Capital, \$1,500,000. Incorporators: J. R. McKinnie, L. R. Bieh, N. S. Gaudy, M. Le la Vergne, W. H. Allen, all of Colorado Springs.

Texas Girl Gold Mining Co., Colorado Springs. General mining business. Capital, \$1,500,000. Incorporators: L. L. Aitken, F. C. Sharer, W. S. Morris, all of Colorado Springs.

Great Western Mining & Leasing Co., Denver. General mining business. Capital, \$7,700. Incorporators: J. R. Elgan, A. S. Alfred, E. L. Worrell, Jr., all of Denver.

The Monte Alto Mining Co., Denver. General mining business. Capital, \$3,500. Incorporators: A. L. Dowd, L. M. Bennett, E. M. Easton, all of Denver.

Fauntleroy Gold Mining Co., Colorado Springs. General mining business. Capital, \$1,250,000. Incorporators: C. C. Hamlin, O. H. Shoup, B. C. Joy, all of Colorado Springs.

Little Mary Mining Co., Telluride. Capital, \$1,250,000. Incorporators: J. H. Miller, E. W. Waybright, T. T. Beach, all of Telluride.

Gold Estates of Cripple Creek Mining Co., Cripple Creek. General mining business. Capital, \$2,500,000. Incorporators: G. D. Hazard, of Colorado Springs; I. W. Bounright, G. R. Buckman, of Cripple Creek.



## DELAWARE.

Concordia Mining Co. General mining business. Capital, \$100,000. Incorporators: G. W. Merrill, of Washington, D. C.; William C. Alberio, John W. Caryl, Jr., of Philadelphia, Pa.

Helma Zinc Co. General mining business. Capital, \$100,000. Incorporators: Frank H. Coyne, of East Orange, N. J.; Walter F. Baker, of Boston, Mass.; James Virdin, of Dover.

## ILLINOIS.

Rock Road Mining Co., French Village. Operating coal mines. Capital, \$2,500. Incorporators: J. Charlton, E. Erlinger, J. F. Anderson, all of French Village.

The Big Muddy Coal & Washing Co., De Soto. General coal business. Capital, \$75,000. Incorporators: G. G. Willard, W. W. Evans, J. E. Dixon, all of De Soto.

Big Four Zinc & Lead Mining Co., Chicago. General mining and milling business. Capital, \$50,000. Incorporators: J. T. Richards, J. L. Frazier, E. Dupes, all of Chicago.

The Desplains Mining Co., Chicago. General mining business. Capital, \$100,000. Incorporators: J. M. Bryant, G. Hunt, E. P. Litzinger, all of Chicago.

The Boulder Mining Co., Chicago. General mining and milling business. Capital, \$48,000. Incorporators: P. Morton, T. P. Shorts, R. P. Ahrens, all of Chicago.

Gold Shield Mining Co., Chicago. Develop and operate mines. Capital, \$20,000. Incorporators: M. A. Wilcox, L. C. Knight, J. I. Friedland, all of Chicago.

The Laclede Coal Co., East St. Louis. Mining, shipping and selling coal. Capital, \$2,000. Incorporators: J. Rauth, N. A. Qualey, of East St. Louis; D. J. Coffey, St. Louis.

## MAINE.

Boston, Philadelphia Zinc & Lead Co., Portland. General mining business. Capital, \$200,000. Incorporators: E. B. Loring, S. Pearce, of Boston; G. H. Thayer, of Braintree, Mass.; H. L. Cram, Leroy L. Hight, both of Portland.

Middlesex Zinc Mining Co., Portland. General mining business. Capital, \$300,000. Incorporators: F. A. Smith, of West Medford; F. E. Houghton, of Boston, Mass.; L. N. Pitcher, of Joplin, Mo.; T. L. Talbot, W. R. Anthoine, of Portland.

## MICHIGAN.

Peak Copper Co., Bessemer. General mining business. Capital, \$2,500,000. Incorporators: W. L. Laffer, H. F. Carleton, O. G. Bechtel, of Cleveland, O.; O. E. Lewis, of Boston; W. J. Prince, of Bessemer.

Chappell & Fordney Coal Co., Saginaw. Coal business. Capital, \$50,000. Incorporators: W. T. Chappell, J. W. Fordney, R. B. Tatham, all of Saginaw.

## MINNESOTA.

Wade Mining Co., Duluth. Mining and manufacturing ore. Capital, \$50,000. Incorporators: W. J. Bates, A. McCrae, A. H. Brown, all of Duluth.

Spruce Mining Co., Duluth. General mining business. Capital, \$1,000,000. Incorporators: M. C. Mackinnon, A. Howell, W. Elder, all of Duluth.

## MISSOURI.

Tan Yard Hollow Lead & Zinc Co., Joplin. General mining business. Capital, \$100,000. Incorporators: W. I. Rush, H. C. Goddard, H. Mills, all of Joplin.

St. Louis Iron & Steel Foundry Co., St. Louis. General iron and steel foundry and machine business. Capital, \$75,000. Incorporators: A. W. Henry, C. A. Pulles, M. M. Henderson, all of St. Louis.

Ohio Mining Co., Joplin. General mining and milling business. Capital, \$10,000. Incorporators: T. Gavin, J. P. Weber, J. Buckel, of Joplin; J. Wilt, L. Wooster, D. E. Peters, F. Gouldner, T. Fleck, all of North Baltimore, O.

Industrial Zinc Mining Co., Kansas City. General mining and smelting business. Capital, \$100,000. Incorporators: A. F. Nathan, O. S. Bowman, J. W. Young, H. A. Willson, A. F. Nathan, Jr., all of Kansas City.

The Bruce Mining & Smelting Co., Webb City. General mining business. Capital, \$400,000. Incorporators: G. E. Rogers, W. N. Snow, E. E. Lyman, L. J. Gunn, of Greenfield, Mass.; J. R. Brown, C. H. Kimball, of Parsons, Kan.; J. C. Stewart, of Webb City and others.

Micajah Mining Co., St. Louis. General mining business. Capital, \$10,000. Incorporators: H. G. Bruns, of Sullivan; S. Daggett, of Franklin County, H. O. Rockwell, of St. Louis.

## NEW JERSEY.

John Weir Lead & Zinc Co.—Principal office, No. 45 Montgomery Street, Jersey City, N. J. Mining. Capital, \$100,000. Incorporators: John Weir,

Frederic F. Culver, Arthur B. Townshend, all of New York City; Louis F. Dodd, Montclair, N. J.

Boston Mining & Milling Co.—Principal office, the Corporation Trust Co.'s building, Jersey City, N. J. Mining. Capital, \$1,500,000. Incorporators: Norman B. Bailey, James S. Warden, S. H. Millard.

National Copper Mining Co.—Principal office, Madison, N. J. Mining. Capital, \$100,000. Incorporators: George A. Stanton, E. G. Snow, Seymour Kisch, all of New York City; Charles E. W. Smith, Madison, N. J.

Sierra Maestra Mining Co.—Principal office, No. 23 Grove Street, East Orange, N. J. Mine iron and manganese, etc. Capital, \$100,000. Incorporators: F. M. da Costa, George M. Gales, W. H. Schroeder, J. J. O'Keeffe, Hobart Ahrens, all of East Orange.

Alaska Copper Co.—Principal office, the Corporation Trust Co.'s building, Jersey City, N. J. Mining. Capital, \$5,000,000. Incorporators: Jacob A. Cantor, Robert H. McCutcheon, Edwin F. Raynor.

United States Iron Co.—Principal office, the Corporation Trust Co.'s building, Jersey City, N. J. Manufacture of steel and iron. Capital, \$1,000,000. Incorporators: William H. Brearley, Clifford W. Perkins, Kenneth K. McLaren.

Excelsior Zinc Mining, Milling & Smelting Co.—Principal office, the Corporation Trust Co.'s building, Jersey City, N. J. Mining, etc. Capital, \$500,000. Incorporators: Rudolph Schalk, Rudolph Schalk, trustee; Albert R. Kampf, William A. Gilchrist, John B. Jones, Charles S. Ward.

Pluto Gold Mining Co.—Principal office, No. 259 Washington Street, Jersey City. Mining. Capital, \$250,000. Incorporators: Rasmus Hoff, J. C. Hoff, A. V. Scott, all of Jersey City.

Philadelphia Steel Co.—Principal office, the New Jersey Corporation Guarantee & Trust Co.'s building, Camden, N. J. Manufacture iron and steel. Capital, \$500,000. Incorporators: Edward M. Middletown, Joseph M. Rowland, Aaron T. Samson, Jr.

## NEW YORK.

Old Sterling Iron Co., Buffalo. Manufacturing iron. Capital, \$80,000. Incorporators: M. J. Baird, F. D. Baird, W. J. Jamison, G. K. Prince, F. B. Baird, all of Buffalo.

Pawling Ore Co., Pawling. Dealing in mining lands, ores, etc. Capital, \$20,000. Incorporators: B. H. Fry, of Amenia; W. Downing, H. C. Carroll, of Pawling; S. Brownell, of Brewsters.

## PENNSYLVANIA.

Pittsburg Iron & Steel Co., Pittsburg. Manufacturing iron and steel. Capital, \$10,000. Incorporators: J. N. Pew, A. E. Pew, W. S. Miller, F. Cross, T. S. Bigelow, all of Pittsburg.

## TENNESSEE.

American Knob Coal & Coke Co., Kingston. General mining business. Capital, \$50,000. Incorporators: W. Fraser, W. H. Savory, of Kankakee, Ill.; H. H. Hannah, B. A. McFerrin, of Oliver Springs; J. W. Staples, of Harriman.

## VIRGINIA.

Logan Consolidated Coal & Coke Co., Roanoke. Buy and operate coal and mineral lands. Capital, \$300,000. Incorporators: F. A. Hill, W. H. H. Dorney, C. A. Fisher, H. D. Lafferty, L. H. Cocke, all of Roanoke.

## WASHINGTON.

Index Anaconda Copper Co., Seattle. Capital, \$50,000. Incorporators: J. D. Farrell, W. E. Pearce, of Seattle; J. E. Stone, of Everett.

Northwest Mining & Development Co., Seattle. Capital, \$2,000. Incorporators: W. I. B. Nichols, R. S. Greene, both of Seattle.

Seattle Gold Mining & Development Co., Seattle. Capital, \$75,000. Incorporators: W. F. Robb, F. O. Grant, E. C. Strong, all of Seattle.

Boston & Tacoma Copper Mining Co., Ltd., Tacoma. Capital, \$1,500,000. Incorporators: H. E. Copley, C. W. Thompson, F. J. Byrne, F. Allyn, Jr., all of Tacoma.

Seattle Cape Nome Mining & Commercial Co., Seattle. Transportation, mining, commercial, etc. Capital, \$1,000,000. Incorporators: A. M. Berkel, F. W. Dickman, G. Curtiss, J. G. Blake, M. Gottstein, all of Seattle.

Republic Reduction Co., Republic. Capital, \$50,000. Incorporators: M. B. Brownlee, W. Mackay, both of Spokane.

Coupon Cariboo Mining Co., Spokane. Capital, \$50,000. Incorporators: J. G. Heeber, P. A. Doggett, E. W. Taylor, all of Spokane.

Stanley Mining Co., Spokane. Capital, \$75,000. Incorporators: H. Brown, G. Holbrook, both of Spokane.

Russell Mining Co., Spokane. General mining business. Capital, \$1,500,000. Incorporators: W. L. Russell, H. N. Galer, H. McGuire, all of Spokane.

Alaska Caughrean Mining Co., Seattle. Capital, \$30,000. Incorporators: G. H. Caughrean, of Missouri; F. B. Reynolds, F. P. Hicks, of Seattle.

Navistoke Hydraulic Mining Co., Tacoma. Capital, \$50,000. Incorporators: T. F. Peterman, B. Haverkamp, S. M. Collins, M. D. Balsar, all of Tacoma.

Ivanhoe Express Mining Co., Spokane. Capital, \$500,000. Incorporators: C. M. Fassett, A. C. Cowherd, F. T. Westren, R. L. Thompson, all of Spokane.

Ignas Valley Mining & Milling Co., Spokane. Capital, \$75,000. Incorporators: J. Bellach, T. Stacey, W. T. Vore, all of Spokane.

Humboldt Mining Co., Spokane. Gold mining. Capital, \$75,000. Incorporators: D. M. Drumheller, T. Daniels, J. L. Drumheller, all of Spokane.

Clackamas Gold Mining Co., Republic. Capital, \$1,500,000. Incorporators: J. L. Hedge, J. C. Kerley, of Republic.

Hardscrabble Consolidated Mining Co., Spokane. Capital, 50,000. Incorporators: E. Pitwood, E. D. Saunders, C. Happy, all of Spokane.

Holden Gold & Copper Co., Chelan. Capital, \$250,000. Incorporators: J. H. Holden, R. H. Lord, of Chelan; T. Maloney, of Olympia.

Great Western Mining Co., Spokane. Capital, \$1,500,000. Incorporators: H. Linke, W. O. Applequist, H. C. Davis, all of Spokane.

Nevada Mining Co., Ltd., Spokane. Capital, \$62,500. Incorporators: O. O. Woodward, H. C. Davis, F. A. Williamson, all of Spokane.

B. & V. Gold Mining Co., Spokane. Capital, \$60,000. Incorporators: J. A. Currie, G. D. Anderson, G. Pahl, E. Doyle, all of Spokane.

Rebecca Extension Copper Mining Co., Spokane. Capital, \$65,500. Incorporators: J. B. Dabney, D. W. Henley, N. Clark, all of Spokane.

Union Silver Star Mining Co., Spokane. Capital, \$1,000,000. Incorporators: J. W. McArthur, L. N. Perkins, L. W. Perkins, all of Spokane.

Golden Free Mining Co., Seattle. Capital, \$2,000,000. Incorporators: J. E. Jordan, J. Bornstein, A. K. Russell, all of Seattle.

## WEST VIRGINIA.

Old Glory Mining & Development Co., San Jose. General mining business. Capital, \$1,000,000. Incorporators: J. J. Morris, of Columbia; W. W. Babb, J. F. Conkey, H. K. Stahl, T. J. Gillispie, all of San Jose, Cal.

Russell Mining Co., Warren, Pa. General mining and shipping iron ore. Capital, \$150,000. Incorporators: J. Hill, W. A. Hall, J. H. Berger, all of Warren; E. S. Allen, G. W. McNaughton, of Cassadaga, N. Y.

Missouri-Arkansas Zinc & Lead Co., Kansas City, Mo. General lead and zinc business. Capital, \$1,000,000. Incorporators: C. H. Kirshner, G. C. Mosher, J. H. Cunn, Miss E. S. Mosher, E. C. Smith, T. Remley, all of Kansas City, Mo.

Kerens Coal & Coke Co., Elkins. General coal and coke business. Capital, \$100,000. Incorporators: H. G. Davis, S. B. Elkins, of Elkins; T. B. Davis, of Keyser; R. C. Kerens, of St. Louis, Mo.; F. S. Landstreet, of Davis.

Southwestern Mining & Reduction Co., Boston, Mass. General mining and milling business. Capital, \$5,000,000. Incorporators: T. Stegner, L. S. Smith, H. B. Church, H. E. Bowden; F. O. Emerson, all of Boston, Mass.

Gold Eagle Mining Co., Concord, N. H. General mining and milling business. Capital, \$1,000,000. Incorporators: G. B. Holden, C. M. Burleigh, J. H. Eastman, H. B. Holden, W. S. McQuotsh, all of Boston, Mass.

The Monongah Co., Monongah. Coal and coke business. Capital, \$1,000,000. Incorporators: J. N. Camden, S. D. Camden, C. B. Alexander, all of Parkersburg; J. A. Fickinger, of Monongah; C. K. Lord, of Baltimore, Md.

The Boston and Jasper County Zinc Mining Co., Boston, Mass. General mining and zinc business. Capital, \$5,000,000. Incorporators: C. H. Rollins, L. C. Benton, I. R. Jones, L. B. Fletcher, H. Rodcliffe, all of Boston, Mass.

West Moreland Steel and Manufacturing Co., Pittsburg. Manufacturing, buying and selling steel, iron and other metals. Capital, \$250,000. Incorporators: C. S. Knight, Jr., C. S. Cook, J. D. Sutherland, of Pittsburg, Pa.; W. S. Wright, H. S. Sands, both of Wheeling.

The Chemical & Electrical Ore Reducing Co., Charleston. General mining and milling business. Capital, \$2,000,000. Incorporators: J. E. Chilton, J. E. Seaggs, T. Popp, J. S. Chilton, W. A. Forsythe, all of Charleston.

## WYOMING.

The Headlight Copper Mining Co., Grand Encampment. General mining business. Capital, \$1,000,000. Incorporators: Philip Lee, A. F. Priest, M. J. O'Rourke, Charles A. Finley, W. C. Henry.







## FINANCIAL NOTES.

## AVERAGE PRICES OF METALS.

in New York per 100 lbs. from January 1st, 1899:

Month	Copper	Tin	Lead	Spelter
January	14.75	22.48	4.18	5.34
February	15.50	24.20	4.49	6.28
March	17.54	23.82	4.37	6.31
April	18.03	24.98	4.31	6.67
May	18.35	25.76	4.44	6.88
June	17.93	25.85	4.42½	5.88
July	18.33	29.63	4.52	5.82
August	18.50	31.53	4.57	5.65
September	18.46	32.74	4.58	5.50
October	.....	.....	.....	.....
November	.....	.....	.....	.....
December	.....	.....	.....	.....
Average	.....	.....	.....	.....

## AVERAGE MONTHLY PRICES OF SILVER.

In New York per ounce Troy, from January 1st, 1899, and for the years 1898 and 1897:

Month	1899	1898	1897
January	59.86	56.77	64.79
February	59.42	56.07	64.67
March	59.64	54.90	63.06
April	60.10	56.02	61.85
May	61.23	56.98	60.42
June	60.43	58.61	60.10
July	60.26	59.06	59.61
August	60.00	59.54	54.19
September	58.89	60.68	55.24
October	60.10	60.42	57.87
November	60.10	60.60	57.91
December	59.42	59.42	58.01
Year	58.26	58.26	59.79

## MONEY IN CIRCULATION.

Comparative statement of the circulation in the United States on Oct. 1st 1899. Comparison being made with statement on September 1st, 1899.

	October 1. Changes
Gold	\$46,561,185 D. \$26,372,007
Silver	145,801,005 L. 5,395,932
Legal Tenders	314,954,600 L. 4,824,179
Treas'y & N't'l B'k Notes	339,688,950 D. 483,165
Totals	\$1,434,014,746 D. \$16,634,061

Gold and Silver certificates and currency are not included in this table. By adding the amounts given in this table with those in the following will give the

total amount coined or issued. The figures herewith are furnished by the Bureau of Statistics Treasury Department.

## MONEY IN TREASURY.

Comparative statement of changes of money in United States Treasury on Oct. 1st 1899, comparison being made with statement, on Sept. 1st, 1899.

	October 1. Changes
Gold	\$122,271,989 L. \$31,285,235
Silver	415,844,704 D. 4,650,483
Legal Tenders	31,726,416 L. 4,824,179
Treas'y & N't'l B'k Notes	4,850,547 L. 352,491
Totals	\$673,693,656 L. 2,163,057

The Gold and Silver bullion on hand in the Treasury is not included in this statement.

## GOLD AND SILVER EXPORTS AND IMPORTS.

At all United States ports, for the month of September, 1899, and 9 months ending September, 1898, and 1899:

	September, 1899	September, 1898
Gold—Exports	\$1,102,810	\$ 618,995
Imports	16,808,341	2,593,894
Excess	\$13,705,531	\$ 1,974,899
Silver—Exports	\$5,152,103	\$3,622,041
Imports	2,900,690	2,376,846
Excess	\$2,251,413	\$ 1,245,195

## NINE MONTHS ENDING AUGUST.

	1898	1899
Gold—Exports	\$1,781,923	\$3,877,838
Imports	127,343,816	34,268,421
Excess	\$114,561,893	\$ 1,399,583
Silver—Exports	\$39,433,500	\$38,728,431
Imports	21,099,224	22,724,095
Excess	\$18,334,276	\$16,014,336

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

## \* WANTS \*

Advertisements of this class containing not more than five lines will be inserted for not exceeding three months in any year, free of charge, to all paid-up annual subscribers. Other than above \$1.00 per month. Advertisements not accepted for less than one month.

**COPPER MINE.** State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work. Send all information possible. Address,

JAMES HOWARD,  
Care The Mining and Metallurgical Journal,  
150 Nassau St., New York, N. Y.

**GOLD** mine anywhere in *United States*, must have at least 1000 feet of *development*; where coal is *not over \$6.00 per ton or wood \$4.00 per cord delivered*; plenty of *water*; no objection to *low grade* ore if profit can be made by *having large plant to amalgamate and concentrate*; want 6 months working *bond*; no *property* considered unless *owners* are prepared to deposit *certified check* for expenses of *engineer* if *property* is *not as represented*. Address with *price and full particulars*

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150 Nassau Street, New York, N. Y.

**EXPERIENCED** man desires position, who can install, run and keep in repair, Steam, Electrical and Mining machinery, has knowledge of assaying and office work. References. Address: W. H. K., McCLOUD, CAL.

**METALLURGIST** and experienced Assayer and Chemist, with practical experience in Copper and Lead smelting, desires position. Speaks Spanish, highest references, address "Globe", JOURNAL office.

## NOTICE TO STEAM USERS.

The National Association of Stationary Engineers is prepared to furnish Engineers of guaranteed ability for any plant in the city or elsewhere. Give us a call. Address: J. T. CHAMBERS, Sec'y, Engine Room City Hall, Los Angeles, Cal.

**WANTED POSITION** by experienced Amalgamator and general Mill men. Have worked in the largest mill on Pacific Coast and Mexico, speaks Spanish, highest references. Apply Con. C. W. Geoghegan Assay Office, 956 3rd St., San Diego, Cal.

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**A GROUP** of 4 Copper claims in Northern Arizona. By-product of gold and silver, recently discovered and show great promise will sell at a great bargain. E. R. HOTSCHILLER, DEWEY, ARIZ.

**A DEVELOPED**, producing and dividend paying Gold Mine, machinery on ground in active and successful operation. A large copper deposit partly developed, with splendid showing. A fine gold-silver prospect partially developed, lack of capital reason for sale. For reports, maps, etc. Address H. P. DURRELL, El Paso, Texas.

**REMAIN** Two Stamp Steam Mill at Tucson, Arizona. 15-H. P. Boiler Pump and every thing complete, set up ready for work. In excellent condition, used less than six months. Address DREDGING MINING MACHINERY CO. Kansas City, Mo.

**ANTIMONY BISMUTH** PROSPECTORS having locations of this nature and wishing to sell at once for cash, will do well to address with full particulars, P. O. Box 2078, SAN FRANCISCO, CAL.

## FOR SALE AT A BARGAIN.

**A 60-TON** copper Smelting Plant, consisting of two 30-ton furnaces, one of which has new seamless liner. Plant is complete in every detail. Also an 80-ton Silver-Lead Furnace, entirely new, never having been set up. All of the above located immediately adjacent to railroad. Enquire of G. A. RIVER, WORTHEN & COSS, dealers in Mining and Mill Supplies, Tucson, A. T.

## The Cleveland Mining and Stock Exchange Co.

New England Building, Cleveland, Ohio.

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## Morgan-Watson Mining and Construction Co.

809-810 New England Building, Cleveland, Ohio

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## JAMES IRVING &amp; CO.

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## ASSAYERS

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Of Open Hearth or Chester Steel. True to Pattern, Sound, Solid. Gearing of all kinds and Crank Shafts. Shoes, Dies, Crusher Plates, Bosses, Taffets and Roll Shells. Steel Castings of every description.

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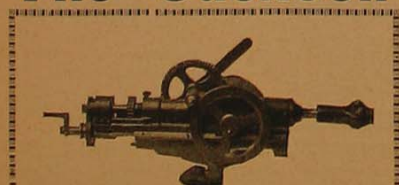
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## MINING STOCK QUOTATIONS

## BOSTON

Adventure	6 13	Mass	10 00
Aetna	4 63	Merced	21 00
Allouez	—	Mohawk	—
Anaconda	49 60	Napa	—
Arcadian	50 00	Old Colony Con.	9 00
Arnold	10 75	Old Dominion	32 63
Atlantic	20 75	Oscoda	88 50
Baltic	24 00	Parrott	48 50
Bingham	15 25	Pioneer	3 00
Bonanza	1 63	Quincy	160 00
Boston & Mont'	355 00	Rhode Island	8 75
Breece	2 50	Santa Fe	12 50
Butte & Boston	79 00	Santa Ysabel	12 50
Calumet & Hecla	780 00	Tamarack	225 00
Catalpa	10	Tecumseh	5 25
Centennial	32 50	Tri-Mountain	9 25
Cochiti	17 00	Victor	5 00
Copper Range	37 00	United States	30 00
Crescent	—	Utah Con.	35 00
Dominion Pref.	—	Washington Ming	2 13
Franklin	7 75	White Knob	—
Gold Dredging	—	Winona	9 00
Humboldt	1 75	Wolverine	41 50
Isle Royale	44 00	Wyandotte	3 25
Melones	2 50		

## ROSSLAND, BRITISH COLUMBIA.

Brand'n & G'da'k	28	Kootenay Gold F.	—
Brit-Amor. Cor.	—	Lilly May	10
Brit. Col. Dev. Co.	—	Lon & Van M.D. Co.	—
Canad. G'd Fields	07 1/2	London B. C. G. F.	00
Cariboo	1 16 1/2	Monte Cristo	05 1/2
Commander	—	New G'd F'ds B.C.S.	50
Deer Park	04 1/2	Novelty	—
Dandee	18	Queen Beas Prop.	5 50
Evening Star	09	Rambler-Cariboo	56
Fern	28	Red Mount. View	—
Gold Fields of B.C.	—	Reco	—
Hattie Brown	—	Silver Bell	—
Hall Mines	—	Silver Queen	—
Homestake	—	St. Elmo	05 1/2
Iron Horse	06	Slocan Star	1 10
Josie	—	Vic. Tr. M. Dev. Co.	—
Jumbo	25	War Eagle Con.	2 75
Kenneth	—	White Bear	—
Keystone	—		

## SAN FRANCISCO.

Alta	04	Mexican	30
Andes	10	Occidental	20
Belcher	33	Ophir	87
Best & Belcher	36	Overman	19
Bullion	04	Ontario	—
Caledonia	70	Plymouth	58
Challenge	30	Potosi	—
Chollar	31	Quicksilver	—
Confidence	80	Quicksilver pref'd	—
Con. Cal. & Va.	1 55	Savage	25
Crown Point	15	Seg. Belcher	03
Deadwood	—	Sierra Nevada	62

Gould & Curry	35	Silver Hill	—
Hale & Norcross	37	Standard	3 05
Homestake	—	Union Con.	38
Iron Silver	—	Utah	12
Justice	08	Yellow Jacket	28

## COLORADO SPRINGS STOCKS

Acacia	26 1/2	Hayden	02
Alamo	09 1/2	Ingham Con.	10
Altamont	—	Isabella	91 1/2
American Con.	—	Jack Pot	85
Anaconda	44 1/2	Kimberly	27
Aols	04 1/2	Lexington	05 1/2
Arcadia Cons.	04 1/2	Magnet Rock	05 1/2
Argentum Junata	32 1/2	Matoa	08 1/2
Bankers	05 1/2	Montreal	08 1/2
Banner	04 1/2	Mountain Beauty	08 1/2
Bob Lee	08 1/2	Mollie Gibson	27
Crescent	15	Mount Rosa	39 1/2
Cripple Crk Con.	18 1/2	New Haven	08 1/2
Dante	18 1/2	Oriole	08 1/2
Des Moines	05 1/2	Orphan	06 1/2
Elkton Con.	1 17	Pharmacist	06 1/2
El Paso	11 1/2	Pilgrim	07
Emp. Almee	02 1/2	Portland	2 45
Fanny B.	04 1/2	Portland	04 1/2
Favorite	05	Pr. Albert	04 1/2
Findley	17	Rattler	07 1/2
Flower of the West	04 1/2	Specimen	08 1/2
Golden Fleece	26	Theresa	13 1/2
Gold & Globe	09	Trachyte	07 1/2
Gold King	04	Union	32 1/2
Gould	30 1/2	Vindicator	1 42
Granite Hill	03 1/2	Work	32 1/2

## SALT LAKE CITY

Anchor	50	Joe Bowers Ex.	05
Ajax	88	La Reine	50
Alliance	—	Lower Mammoth	25
Alice	40	Little Pittsburgh	03 1/2
Bullion Beck	3 85	Mammoth	3 48 1/2
Buckeye	—	Mercur	6 83
Cent. Eureka	68 00	May Day	61
Chloride Point	25	Northern Light	14 1/2
Congor	—	North Swansea	10
Daly West	1 41	Omaha	13
Dalton & Lark	03	Ontario	8 20
Dalton	01	Petro	20
Dexter	2 45	Rich. Anaconda	29
Eagle	19 1/2	Sunbeam	3 92 1/2
Eagle & Blue Bell	1 45	Sunbeam	67 1/2
Emerald	12	Sacramento	46
Four Aces	13 1/2	Silver King	45 00
Geyser-Marion	34	Star Consolidated	43
Grand Central	5 5	Shower Con.	36
Golden Eagle	0	Tetro	05
Horn Silver	1 17 1/2	Utah	60
Homestake	04 1/2	Valco	85
Ingot	09	West M'n Pl'cer	11
Joe Bowers	17	Yankee Con.	15 1/2

## NEW YORK.

Adams Con	12	Isabella	92 1/2
Alamo	09 1/2	Iron Silver	54
Alice	60	Jefferson	10
Alliance	—	Jennie Blanche	—
Anaconda Copper	03	Justine	—
Anaconda Gold	44 1/2	King & Pemb	18
Anchor L.	69	Leadville Cons.	08
Argentum Junata	24	Little Chief	11
Belcher	20	Mexican	30
Best & Belcher	43	Mollie Gibson	27
Burt Gold	—	Mt. Rosa	—
Breece	1 55	Occidental	15
Brunswick	27	Ontario	8 50
Chollar	35	Ophir	90
Chryso	—	Pharmacist	—
Comstock Tunnel	04	Phoenix	09
Comstock Stocks	04	Plymouth	08
Comstock Script.	04	Portland	2 38
Con. Cal. & Va.	1 75	Potosi	60
Cr. & Gr. Creek	1 50	Quicksilver	1 50
Crescent	15	Quicksilver p'd	7 50
Crown Point	12	Rocky Mountain	—
Cripple Creek Con.	18	San Juan Star	—
Deadwood Terra	70	Savage	24
Elkton	1 10	Sierra Nevada	20
Emp. Almee	—	Small Hope	1 25
Good Samaritan	—	Specimen	—
Gold Coin C. Crk	2 10	Standard Con.	2 90
Gold Coin Gilpin	—	Syndicate	—
Golden Fleece	27	Union Con.	33
Gould & Curry	30	Union	32 1/2
Gregory Gold	—	Utah Con.	10
Hale & Norcross	30	Union Gold	—
High Five	—	Vindicator	—
Homestake	65 00	Work	32
Horn Silver	1 25	Yellow Jacket	25

## SPOKANE, WASHINGTON.

Ben Hur	15	Mountain Lion	1 08
Black Tail	14	Morrison	—
Butte and Boston	05 1/2	Number Six	—
Cariboo	—	Pearl	—
Deer Trail No. 2	22	Princess Maude	11
Enterprise	—	Quill	14
Insurgent	04	Rebate	12
Iron Monitor	—	Republic	—
Jim Blaine	31	San Poll	49
Liberty	—	Tom Thumb	17
L. Pine Surp. Con	23	Winnipeg	—
Morning Glory	11 1/2		

## DENVER STOCK REPORT.

Aetna	—	Keystone	11 1/2
Anchor Leland	70	Lillie	—
Anaconda	44 50	Matoa	32 1/2
Arcadia	—	Mollie Gibson	27
Argentum Junata	25 1/2	Mont. Anchor	39 1/2
Banner	—	Mt. Rosa	39 1/2

Bob Lee	08 1/2	Old Gold	—
Elkton	1 17	Peoples	—
El Paso	41 1/2	Pilgrim	07 1/2
Enterprise	—	Pine Creek	2 45
Fanny B.	00 45	Portland	—
Garfield	15 1/2	Prince Albert	04 1/2
Geo. Washington	—	Republic	08
Golden Eagle	—	Sacramento	09
Gold Coin	2 10	Smuggler	—
Gilpin & C. Co.	—	Specimen	13 1/2
Gilpin Four	—	Tamarack	—
Golden Fleece	26	Union	32 1/2
Isabella	91 1/2	Virginia M.	08 1/2
Iron Clad	08 1/2	Wheels Cons.	32 1/2
Jack Pot	85	Work	—

## MEXICO

Name of Company	State	Price
Amistad y Concordia	Hidalgo	28
Angustias	Guanajuato	200
Areyalo y Anexas	Hidalgo	200
Asturiana y Anexas	Zacatecas	180
Barrados y Cabras	Durango	40
Bartolome de Medina	Hidalgo	88
Cabezon y An	Zacatecas	15
Candelaria de Pinos	Mexico	180
Capuza	Durango	30
Carmen	Hidalgo	400
Cinco Senores y An	Guanajuato	350
Concepcion y Anexas	S. Luis Potosi	200
Coronas	Mexico	75
El Oro	Guanajuato	30
El Oro, pref.	Guanajuato	30
Eparanza y An	Mexico	1,600
Gloria	Chihuahua	50
Guadalupe	Guanajuato	235
Luz de Borda Aviado	Hidalgo	30
Luz de Borda Aviado	Michoacan	100
Luz de Maravillas	Hidalgo	120
Pabellon	Hidalgo	20
Palma de Bomb	Zacatecas	80
Pinoles	Guanajuato	2,000
Rafael y Anexes	Hidalgo	1,020
Real del Monte	Hidalgo	500
Restauradora	Durango	20
Rosario y Anexas	Durango	10
San Francisco	Hidalgo	185
San Rafael Aviado	Hidalgo	410
San Rafael del Oro	Hidalgo	20
Sta. Maria de la Paz	S. Luis Potosi	240
Soledad	Hidalgo	320
Sorpesa	"	250
Trinidad Aviado	Guanajuato	50
Union Hacia	Guanajuato	40
Union Hacia	Hidalgo	350
Zona Min. de Paz	Guanajuato	60

NOTE.—The above Mexican stocks are figured on the basis of Mexican silver

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Assayer and Chemist,

(Established 1879)

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## SPECIMEN ASSAY PRICES:

Gold silver and lead, \$1.00; any two of the above, 75c; any one of above, 50c; copper analysis, \$1; platinum, nickel or tin, \$5.00.  
Write for full price list and mailing envelopes

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Maker and Repairer

of Transits, Levels and all other instruments used in mining. Fine assorted stock of Keuffel and Esser goods. Also Microscopes, Barometers, Field Glasses, Thermometers, Hydrometers, etc.

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Los Angeles, California

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AIR COMPRESSORS  
ROCK DRILLS,  
Stone Channelers,  
The Pohle Air Lift Pump,  
Coal Cutters,

THE INGERSOLL-SERGEANT DRILL COMPANY, HAVEMEYER BUILD'G  
NEW YORK  
PARKE & LACY CO., AGENTS, SAN FRANCISCO, CAL.

New Catalogue No. 32

New Catalogue No. 41

Pamphlet No. 100

Catalogue No. 72

Special.

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FRANK O. BECK, Sec'y and Treas.  
THE PORTLAND GOLD MINING CO.,  
(Stock Transfer Office, Colorado Springs.)  
Mines at Victor, Colorado.

COLORADO SPRINGS, COLO., May 19, 1898

The Ingersoll-Sergeant Drill Co.,  
Gentlemen:—We bought two years ago one of the largest size of the straight line type of Ingersoll-Sergeant Piston Inlet Compressor.

This was found to be too small for our needs about a year ago and we purchased of you a Duplex Corliss machine 16" x 18" x 42".

This was set in place in our shaft house in the Cripple Creek District, 10,000 feet above the level of the sea, and has been running continuously ever since, and at times over 35% of the time. The steam cylinders were connected to an independent Jet Condenser, for which we are using thimble water, and the resultant economy of operation is very noticeable.

The operation of this Compressor is as near perfect as that of any machine we have ever seen, and this type is well worth the extra cost on account of the great permanent economy in operation.

Our mine is equipped exclusively with your drills and we have only the highest words of praise to give them.

Yours very truly, The Portland Gold Mining Co.,  
Jas. A. Burns, President



## INCORPORATED MINES PAYING DIVIDENDS.

	NAMES OF MINES	LOCATION	No. of Shares	Capital Stock	Par Value	Amount of last Dividend	Date of Last Dividend	Total Amount Paid in Dividends	Kind of Minerals Produced
1	Aetna Cons.	California	100,000	500,000	\$ 5	\$ 10	Oct 1899	\$ 195,000	Q.
2	Alamo	Utah	125,000	125,000	1	02	April 1899	2,500	G, C, I.
3	Alaska, Treadwell	Alaska	200,000	5,000,000	25	37½	July 1899	4,145,000	G.
4	Alaska Mexican	Alaska	200,000	1,000,000	5	10	July 1899	411,031	G.
5	Anaconda Copper	Montana	1,200,000	30,000,000	25	2 00	Nov 1899	12,150,000	C.
6	Anchoria Leland	Colorado	600,000	600,000	1	03	Apr 1899	198,000	G.
7	American Gold	Colorado	300,000	3,000,000	10	09	June 1899	434,000	G, S, I.
8	American Coal	Maryland	60,000	1,500,000	25	1 25	Sept 1899	727,500	Coal
9	American Zinc, Lead and Smelting	Missouri	200,000	500,000	25	10	Oct 1899	40,000	Z, L.
10	Anrora	Michigan	100,000	2,500,000	25	50	June 1899	890,000	I.
11	Argonaut	California	200,000	2,000,000	10	10	Aug 1899	340,000	
12	Bald Butte	Montana	250,000	250,000	1	06	Sept 1899	747,141	G, C, S.
13	Bonanza Development	New Mexico	300,000	3,000,000	10	3 50	June 1899	1,500,000	
14	Boston & California	California	600,000	600,000	1	06	June 1899	72,000	
15	Boston and Colorado Smelting	Colorado	15,000	750,000	50	5 00	April 1899	375,000	
16	Boston & Montana Con.	Montana	150,000	3,750,000	25	10 00	Aug 1899	12,275,000	G, C, S.
17	Breece	Colorado	200,000	5,000,000	25	05	Sept 1899	60,000	I.
18	Bullion Beck and Champion	Utah	100,000	1,000,000	10	10	Sept 1899	2,408,400	G, S.
19	Bunker Hill and Sullivan	Idaho	300,000	3,000,000	10	07	May 1899	705,000	S, L.
20	Cariboo	British Col.	800,000	800,000	1	01½	Feb 1899	248,965	G.
21	Calumet & Hecla	Michigan	10,000	2,500,000	25	20 00	Sept 1899	64,850,000	C.
22	Centennial Eureka	Utah	30,000	1,500,000	50	50	Aug 1899	2,150,000	S, L.
23	Central Lead	Missouri	10,000	1,000,000	100	50	Sept 1899	127,000	L.
24	Charleston	S. Carolina	10,000	1,000,000	100	2 00	June 1899	200,000	
25	Colorado Smelting	Montana	100,000	1,000,000	10	1 00	Jan 1899	1,945,000	G, S, C.
26	Consolidated Tiger and Poorman	Idaho	1,000,000	1,000,000	1	02	Dec 1898	20,000	G, S.
27	Creston Leasing	Colorado	1,000,000	1,000,000	1	01	Dec 1898	54,000	
28	Crowned King	Arizona	600,000	6,000,000	10	02	Dec 1898	232,000	G, S, L.
29	De Lamar	Idaho	400,000	2,000,000	5	12	May 1899	2,346,000	G, S.
30	Deer Trail No. 2	Washington	1,000,000	1,000,000	1	25	Sept 1899	40,000	
31	Doe Run	Missouri	5,000	500,000	100	50	Sept 1899	85,000	L.
32	Empire State Idaho	Idaho	75,000	750,000	10	30	Sept 1899	229,375	
33	Fanny Rawlings	Colorado	1,000,000	1,000,000	1	01	Aug 1899	20,000	G, S.
34	Ferris-Haggerty	Wyoming	1,000,000	1,000,000	1	00½	Mar 1899	5,000	C, G, S.
35	Garfield Consolidated	Colorado	1,200,000	1,200,000	1	01	May 1899	34,000	G.
36	Golden Star	Ontario, Canada	100,000	100,000	1	01	July 1899	41,000	
37	Gold Coin of Victor	Colorado	1,000,000	1,000,000	1	03	Sept 1899	240,000	G.
38	Gold King	Colorado	1,000,000	1,000,000	5	05	Sept 1899	60,000	G.
39	Golden Cycle	Colorado	200,000	1,000,000	5	05	Sept 1899	228,500	G, S, C, L.
40	Grand Central	Utah	250,000	250,000	1	24	Sept 1899	668,250	G.
41	Gwin	California	20,000	1,000,000	50	25	Aug 1899	81,500	
42	Grass Valley Exploration	California	50,000	100,000	2	25	July 1899	12,500	
43	Helena and Frisco	Idaho	500,000	2,500,000	5	25	June 1899	550,000	S, L.
44	Highland	S. Dakota	100,000	10,000,000	100	20	July 1899	3,924,718	G.
45	Holy Terror	S. Dakota	300,000	300,000	1	01	July 1899	142,000	G.
46	Homestake	S. Dakota	125,000	12,500,000	100	50	Sept 1899	7,828,750	G.
47	Horn Silver	Utah	400,000	10,000,000	25	05	July 1899	5,270,000	S, L.
48	Idaho	British Col.	500,000	500,000	1	05½	Jan 1899	292,000	
49	Isabella	Colorado	2,250,000	2,250,000	1	01	Sept 1899	472,500	G.
50	Jack Pot	Colorado	1,000,000	1,000,000	1	04	Sept 1899	75,000	G.
51	Jamison	California	390,000	3,900,000	10	10	April 1899	50,700	
52	Lake Superior Iron	Michigan	84,000	2,100,000	25	1 00	Feb 1899	736,000	I.
53	Lillie	Colorado	1,000,000	1,000,000	1	05	Sept 1899	279,110	G.
54	Modoc	Colorado	500,000	500,000	1	02	Sept 1899	170,000	G.
55	Montana Ltd	Montana	660,000	3,300,000	5	12	Apr 1899	2,997,557	G, S.
56	Montana Ore Purchasing	Montana	40,000	1,000,000	25	1 00	Sept 1899	1,280,000	
57	Morning Star	California	2,400	240,000	100	3 00	Sept 1899	744,800	G.
58	Mercur	Utah	200,000	5,000,000	25	12½	July 1899	1,291,000	G.
59	Mammoth	Utah	400,000	10,000,000	25	15	Sept 1899	1,530,000	G, S, C, L.
60	Mead	California	2,000,000	2,000,000	1	20	June 1899	120,000	G.
61	Monument	Colorado	300,000	300,000	1	01	Dec 1898	12,624	
62	Moulton	Montana	400,000	2,000,000	5	05	Feb 1899	480,000	
63	Mt. Shasta	California	20,000	100,000	5	30	May 1899	6,000	
64	New York & Hon. Rosario	Central A.	150,000	1,500,000	10	10	Sept 1899	1,110,000	S, G.
65	Napa Cons.	California	100,000	700,000	7	30	Oct 1899	1,040,000	Q.
66	New Idria Quicksilver	California	100,000	500,000	5	30	Oct 1899	170,000	Q.
67	North Star	California	200,000	2,000,000	10	25	Apr 1899	550,000	G.
68	Original Empire	California	50,000	5,000,000	100	1 00	May 1899	500,000	G.
69	Osceola	Michigan	50,000	1,250,000	25	3 00	June 1899	2,801,500	C.
70	Parrot	Montana	230,000	2,300,000	10	1 50	May 1899	2,690,898	
71	Pennsylvania Consolidated	California	51,500	5,150,000	10	20	Sept 1899	105,575	
72	Pioneer	California	100,000	1,000,000	10	12½	Mar 1899	62,500	G.
73	Portland	Colorado	3,000,000	3,000,000	1	02	Sept 1899	2,347,080	G, S.
74	Plumbago	California	300,000	300,000	1	15	Jan 1899	45,000	G.
75	Quicksilver Pref.	California	43,000	4,300,000	100	50	May 1899	1,845,411	Q.
76	Quicksilver Consolidated	California	57,000	5,700,000	100	40	July 1899	643,867	Q.
77	Quincy	Michigan	100,000	2,500,000	25	6 00	August 1899	11,070,000	C.
78	*Republic Consolidated	Washington	3,000,000	3,000,000	1	01	Sept 1899	323,000	G.
79	Rambler-Cariboo	British Col.	1,000,000	1,000,000	1	01	April 1899	50,000	
80	Royal Consolidated	British Col.	2,500,000	2,500,000	1	01	June 1899	1,050,000	G.
81	Sacramento	Utah	1,000,000	5,000,000	5	00½	Sept 1899	133,000	G.
82	Small Hopes Consolidated	Colorado	250,000	5,000,000	20	10	Feb 1899	3,325,000	S.
83	South Swansea	Utah	150,000	150,000	1	05	Sept 1899	150,000	S, L.
84	Standard	Idaho	500,000	500,000	1	08	Apr 1899	1,745,000	G, S.
85	Standard Consolidated	California	200,000	20,000,000	100	10	Aug 1899	3,879,226	G, S.
86	St. Joseph	Missouri	30,000	3,000,000	10	50	June 1899	2,859,500	L.
87	Silver King	Utah	150,000	3,000,000	20	25	Sept 1899	2,250,000	S, L, G.
88	Smuggler	Colorado	1,000,000	1,000,000	1	01	Sept 1899	1,185,000	S, L, Z.
89	Swansea	Utah	100,000	500,000	5	05	Oct 1899	241,000	S, L.
90	Tamarack	Michigan	60,000	1,500,000	15	4 00	June 1899	5,910,000	C.
91	Tomboy	Colorado	200,000	2,000,000	10	4 00	May 1899	730,000	G.
92	Utah	Utah	100,000	1,000,000	10	02	Jan 1899	179,000	G.
93	Vindicator Consolidated	Colorado	1,500,000	1,500,000	1	05	July 1899	253,750	G.
94	War Eagle Consolidated	British Col.	2,000,000	1,000,000	1	01½	Sept 1899	414,000	
95	Wolverine	Michigan	60,000	2,500,000	25	1 50	Oct 1899	270,000	C.
96	Yellow Aster	California	100,000	1,000,000	10	10	Sept 1899	253,789	G.

S. Silver; G. Gold; L. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

N. B.—Companies not listed paid nothing in the last twelve months. \*Paid since consolidation, \$203,000; Republic paid \$120,000 under old management.



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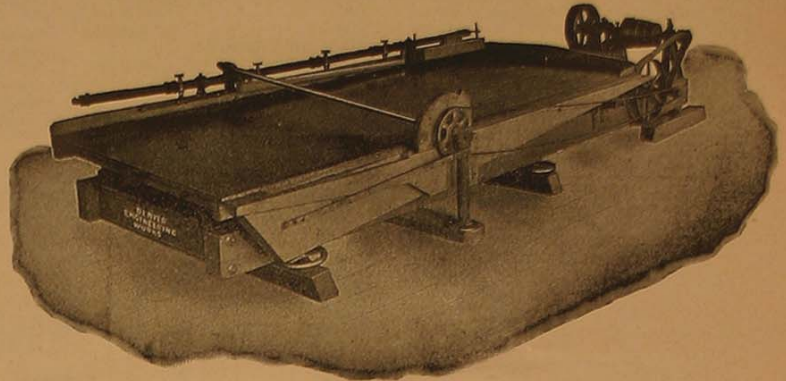
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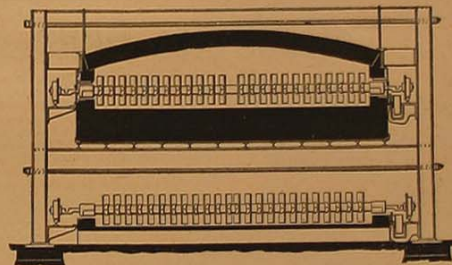


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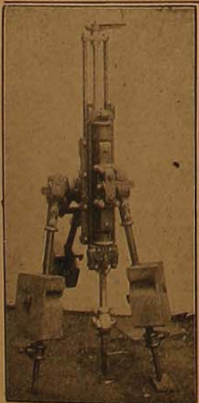
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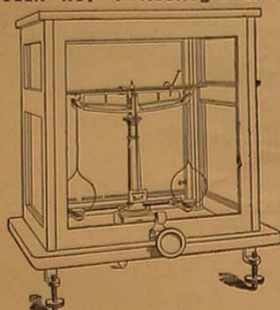


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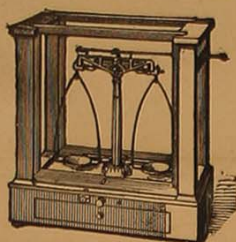
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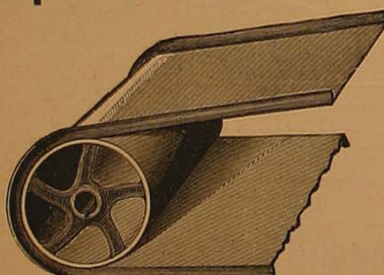
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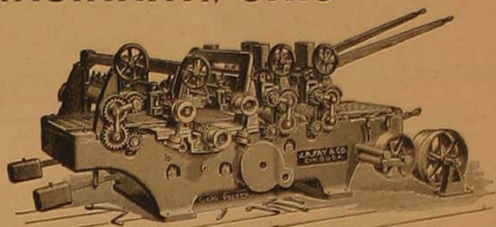
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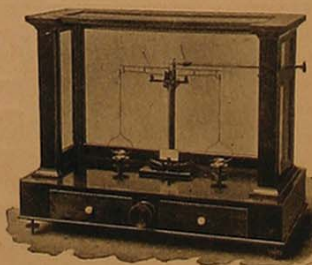
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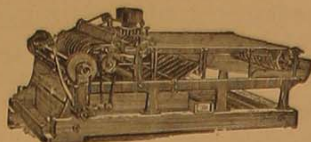
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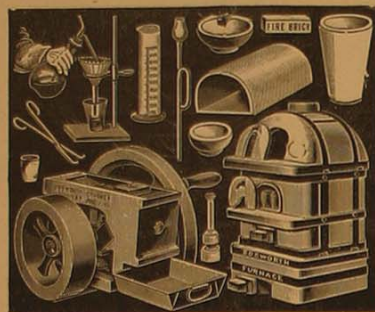
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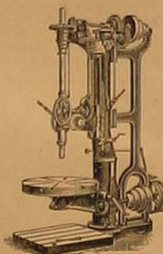
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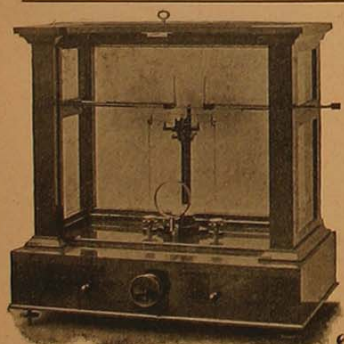
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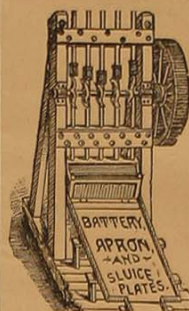
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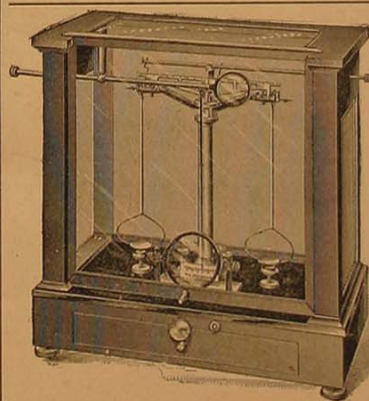
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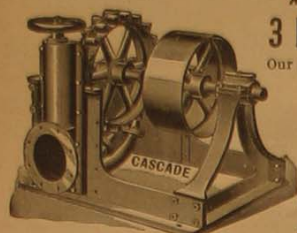
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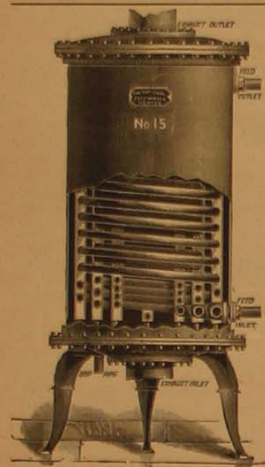
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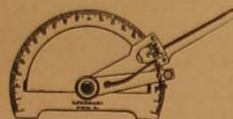
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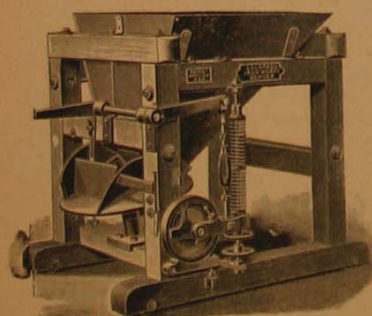
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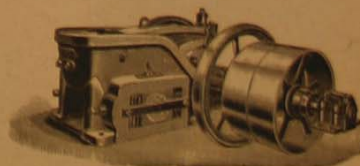
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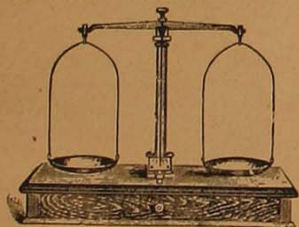
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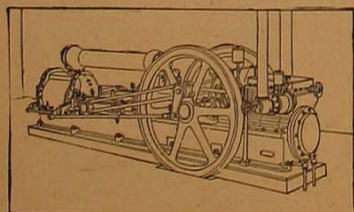


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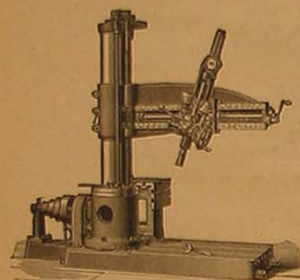
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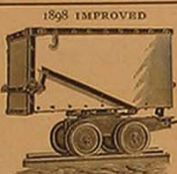
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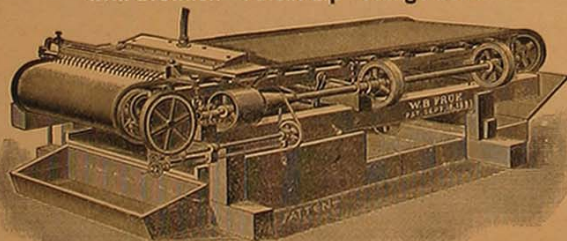
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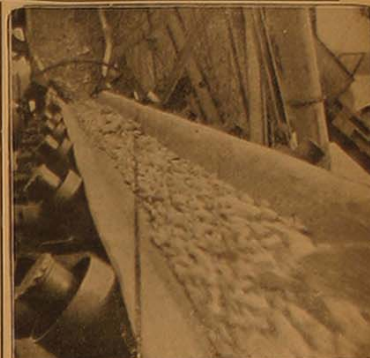
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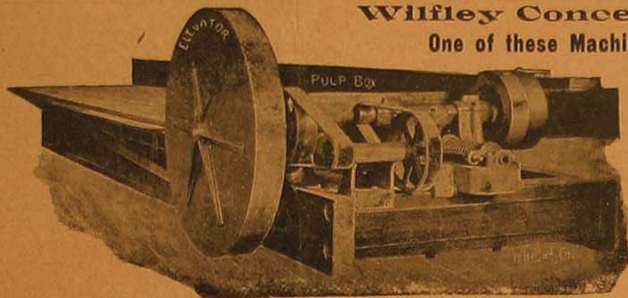
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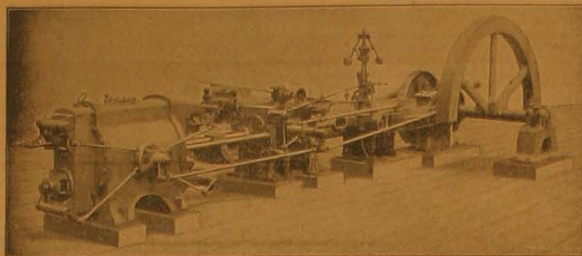


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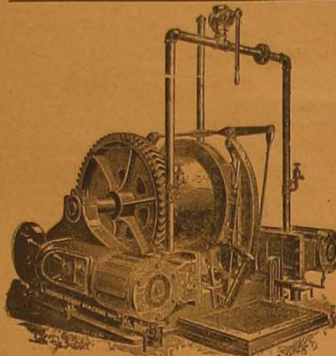
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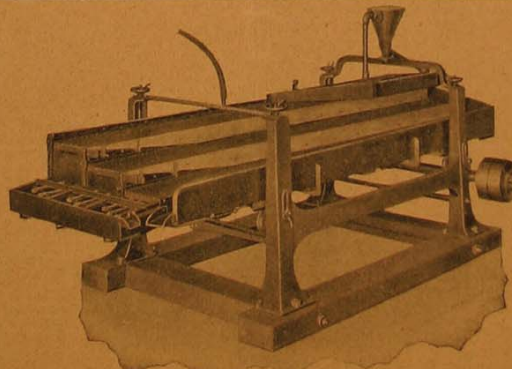
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